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Standards for Electroplating

Conference on Exposure Tests of Electroplated Metals Held Under the Auspices of the Chicago Branch and Research Committee of the American Electroplaters' Society

ON January 16, 1931, a meeting was held in Chicago, at which about fifty persons were present including the Officers and Research Committee of the American Electroplaters' Society, members of Committees A-5 and B-3 of the American Society for Testing Materials, and representatives of manufacturers interested in electroplating materials, processes and products.

The principal subject discussed was an outline for exposure tests of specimens to be prepared at the Bureau of Standards by P. W. C. Strausser, Research Associate of the American Electroplaters' Society, and exposed at the locations maintained by the A.S.T.M. in different parts of the country.

Recommendations

The principal recommendations of the conference were as follows:

1. The initial tests should include steel samples plated with zinc, cadmium, copper, nickel, or chromium, or combinations of such coatings. This course will make it possible to obtain direct comparisons of the values of these coatings for protecting steel against atmospheric corrosion. Subsequent tests will include coatings on non-ferrous metals.

2. In the preparation of such samples, only solutions of known and published composition will be employed, and no reference will be made in the reports to any patents.

3. Additional specimens will be prepared at the same time for use in laboratory studies upon methods of stripping, and upon accelerated corrosion tests, in order to determine whether there is any correlation between the results of laboratory and exposure tests.

Numerous details of the tests and methods of inspection were discussed. The program will be revised in the light of these suggestions and efforts will be made to prepare and expose the samples of plated steel as soon as possible.

At a meeting of the Officers and Research Committee on January 18, it was decided that the representatives of the Electroplaters' Society on the special committee to make inspections of the plated coatings will be J. Hay, Chairman of the Research Committee, P. Sievering, Secretary, and A. K. Graham. The A.S.T.M. is represented on this inspection committee by W. Blum, W. M. Phillips, and one other member to be appointed.

On January 17, 1931, a meeting was held in Chicago at which most of the same persons were present as at the conference on January 16th.

There was a general discussion of the need for specifications for (a) materials used in plating and (b) plated products; and of the principles to be used in the preparation of such specifications. These principles were illustrated by reference to existing specifications of the Federal Specification Board and various technical societies. It was agreed that the Electroplaters' Society would render a distinct service to both manufacturers and users by preparing and adopting suitable standards, and cooperating wherever feasible with other organizations interested in this field.

Sub-Committees to Prepare Standards

No attempt was made in this conference to decide upon the details of any standards. At a meeting of the Officers and Research Committee of the American Electroplaters' Society on January 18th, it was decided to form two subcommittees to prepare such standards. C. F. Nixon of the Ternstedt Manufacturing Company was appointed chairman of the committee on standards for plating materials, and H. S. Lukens of the University of Pennsylvania was made chairman of a committee on standards for electroplated products.

Notes on the Manufacture of Small Brass Parts

By A. EYLES

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In view of the increasing use of small brass parts in industry, a paper on "Some Modern Developments in the Manufacture of Small Brass Parts" recently read by A. Crowther, Metallurgist of Pegler Brothers and Company, Ltd., Doncaster, England, is of interest, as it describes methods employed in that company's plant.

BRASS products and component parts in industry, are made by the following main processes:—

(1) By the casting of molten metal.
(2) Forging and hot rolling.
(3) Cold rolling and drawing through dies.
(4) Hot pressing or stamping.
(5) Cold stamping from sheet brass; any of which may be followed by tooling in the brass machine shop.

The lecturer stated that the plant with which he was connected was concerned chiefly in the production of castings and hot pressings followed by the customary finishing processes in the brass machine shop. He then went on to describe the ordinary practice of making molds by hand and the melting of the necessary metal in crucibles by means of coke-fired furnaces of the pit type; following which he dealt with the development of molding machines, pointing out that the greatly increased production these rendered possible necessitated steps being taken to bring the melting plant into line.

Coke and oil-fired tilting furnaces of the crucible type constituted the first step in this direction, but eventually oil-fired open hearth units of three tons capacity were decided upon. Such furnaces allow sufficient time between the melting of the metal and the attainment of casting temperature, for an analysis to be made and the necessary additions made to bring the composition to standard.

As is well known, making brass castings in sand has a number of disadvantages—sand is apt to be washed loose by the flow of metal—to be found subsequently in the walls of the casting. The surface is not smooth and retains grains of sand. If a casting had to be machined, suitable allowance had to be made so that the cutting tool could get under the skin, otherwise a good cutting edge could not be maintained. But more serious than this is the shrinkage. The metal is poured into the mold and for a time can be "fed" from the still molten runner. After complete solidification, however, there is still considerable shrinkage as the metal cools down. In the worst cases this results in cavities or "draws," but in any case there is developed a certain amount of intercrystalline weakness. Thus it is difficult to get a sand casting in brass giving more than 15 tons per square inch, whereas, forged brass metal readily gave 28 tons per square inch. For these reasons metallurgists and engineers give preference to other processes, where possible, and simple parts, such as valve spindles, bolts, screws, etc., were made from extruded rod or drawn brass wire.

A Battery of Automatic Machines for Working Extruded Brass Rods

Photo by A. Horner and Sons, Settle, England.

Hot Pressings

The next big step was the development of hot pressings and stampings. The process is not new and was exten-

sively employed during the late European war to produce simple brass parts such as fuses, etc. The plant consists in essence of machines which brought two half-dies together with great force. Extruded rod is used as the raw material, and this is cut into pieces of the precise weight of the finished parts, which are then suitably heated to a red color. A piece is placed in the lower part of the die and the machine then forms the object by bringing the dies together. This modern process began by producing parts of simple design and has made astonishing progress during the past few years. Much ingenuity has been displayed by die makers and many brass component parts are now made which only a short time ago were thought quite impossible. Finality had been by no means attained, and the brass foundry is today continually losing work to the modern brass stamping shop.

The reason is not far to seek, the product or component part being produced under pressure is free from cavities. There are no sand or dross inclusions, and the brass metal itself has the close-grained duplex structure which gives strength. Moreover, the articles can be produced to size with a surface which in many cases needs no further treatment, with the result that subsequent machining operations are reduced to a minimum.

As there has been in some quarters an idea that the metal used for extruded rod and hot stamping (copper 57.5 per cent, zinc 40.5 per cent, lead 2 per cent) would be deficient in lasting qualities, it may be of interest to give the facts. Firstly, as regards attrition or wear by abrasion, stamped or pressed parts are markedly superior to ordinary yellow brass and low grade gunmetals, and were used where resistance to wear, and toughness were essential. In corrosion tests there was practically no difference between hot stamped brass and yellow cast brass.

Electric Melting

The most striking development at the moment was the introduction of electric melting into non-ferrous metallurgy. In Great Britain electricity established itself in steel foundries during the European war period, but comparatively little was done to apply it to brass. In America, however, for a variety of reasons more attention was given to the matter and considerable numbers of electrical units were in operation at a comparatively early date.

These were divisible into two main classes: (1) those in which the heat was produced in a resistor and radiated onto the molten metal bath, and (2) where the metal itself formed the resistor, the electric current being induced in the charge by a coil outside the furnace. Furnaces of the latter type have been found to be particularly adapted to the making of brass billets for extrusion and strip for rolling. A considerable number are operated for this purpose in Great Britain. Most of the billets at one plant are made in two of them and it is giving very satisfactory results. Two of the salient points of this system are that no furnace gases could be absorbed by the molten metal and since there is an electrical effect producing a rotary motion of the liquid metal no stirring with iron rods is necessary. In this way are eliminated three of the metallurgist's main enemies—sulphur, hydrogen and iron.

The conditions of labor also are immensely improved, the heat is employed in melting metal and not allowed to escape from the furnace, the result is that instead of a workman stripped to the waist, freely perspiring, and whose physical endurance is barely equal to the task of staying out his shift, an ordinary workman can now be seen going quietly about his work and able to take an intelligent interest in the finer points of his job.

Furthermore, when melting by older methods an analysis of each heat was necessary to ensure the composition being within the narrow limits essential where the metal is to be used for hot pressings. Melting electrically, however, the chemist or metallurgist can keep an adequate check by analyzing about one heat in six.

Future Possibilities

The field for hot pressings will doubtlessly be greatly extended. Die makers have by no means exhausted their skill, and there appears to be no sign of abatement in the rate of progress. Many articles whose present shape does not lend themselves to manufacture by stamping could be so produced by modifying the design. In many cases only prejudice stands in the way.

Die casting has developed with enormous rapidity of late. Successful application of this method is confined mainly to low and medium melting point alloys. Certain simple component parts are also made in brass. It is considered that the value of the process as applied to brass and other high melting point alloys has yet to be demonstrated.

Metallurgists are drawing the attention of manufacturers to the very valuable properties of certain copper-aluminum and copper-silicon alloys. They are amenable to heat treatment like steel, and very valuable properties can be induced by this means. These modern alloys also have very high resistance to corrosion. Their successful working, however, demands a high degree of technical skill both in the foundry and afterwards. Die casting in brass has made definite progress. Machines for the purpose are now on the market.

In conclusion, it may be safely stated that the value of electricity as a source of heat will be more and more realized in the non-ferrous industry and that the next few years will see a noteworthy development in its application both to the melting and annealing of non-ferrous metals. Its use makes for quality, ease of control, and decent working conditions, and given a reasonable price for electrical current, very substantial economies can be effected in modern brass foundry practice in many instances.

Bright Brass on Iron

Q.—We would be pleased to have any information you might be able to give us on producing a bright brass finish on wrought iron and cast iron stove parts.

Most of the books we have on plating advise using a small quantity of arsenic in brass solutions to act as a brightener on brass plated work, but they also advise extreme care in handling, warning against using too much arsenic, and we are wondering if there is some other agent you could recommend which would be easier of control.

A.—When arsenic is used as a brightener in a brass solution, very good results will be had if you will follow the directions outlined on page nine of our PLATERS' GUIDEBOOK.

If an excess is introduced into the solution, it can be removed by hanging some old work or racks on the cathode rod and working solution at a high current density for some time.

Phenol is also used as a brightener in brass solutions, with good results, and an excess of this will not cause as much harm as an excess of arsenic. Phenol, or carbolic acid, should be taken up with caustic soda. About 5 ounces of phenol is added to each 100 gallons of brass solution.

OLIVER J. SIZELOVE.

New Developments in Machining Aluminum and Its Alloys

By R. L. TEMPLIN

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Much information has already been published on the general subject of machining aluminum. The many improvements, however, that are constantly being made both in machine tools and in the alloys of aluminum, present new problems whose solutions bring out many facts heretofore unemphasized or unrecognized. Introduction of new materials such as cemented-tungsten-carbide for cutting tools has stimulated research work in machining aluminum, as in the case of other metals, with results which modify previously determined machining practice.

This is a paper presented at the production meeting of the Society of Automotive Engineers, at Detroit, Mich., October 7 and 8, 1930.

At the risk of some repetition it seems advisable to point out first the essential shape requirements of a cutting tool best suited for use in machining aluminum and its alloys. As the result of considerable experimental work substantiated by data from the production fields, it appears that such a tool should have a top rake of about 45 deg., a side rake of about 15 deg., a front or back clearance of about 7 deg., making the total included angle of the cutting edge approximately 38 deg. (See Fig. 1.) In addition, it should be emphasized that the edges of the tool must be keen, that is, smooth and free from wire-edges or burrs.

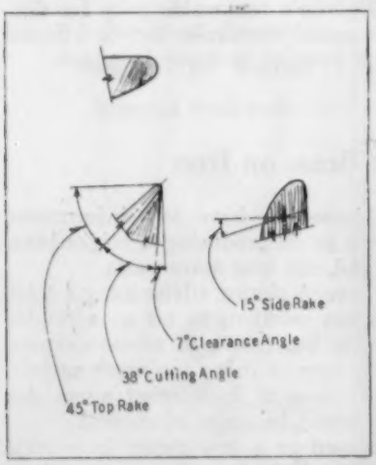

Fig. 1—Cutting Tool for Aluminum

When used under proper conditions a tool meeting these requirements will produce (1) a clean cut, smooth surface on the work; (2) a minimum amount of disturbance both to the surface of the work and to the metal being removed; (3) a minimum amount of frictional heat; and (4) little if any deposition of metal on the top of the cutting edges of the tool. In view of these facts, such a tool may be considered as best suited for cutting aluminum and its alloys. It must be recognized however, that this tool may not always produce the greatest amount of finished work with the least attention, shortest time and lowest cost. That is, it may not be the most efficient tool to use under every given set of operating conditions. This will be understood better from what follows in this discussion.

Unfortunately for the machinist there are many factors which must be given proper consideration simultaneously with tool shape if best results are expected in the machining of aluminum, as with other metals. The more important of these factors include (1) type of tool, (2) tool material, (3) rate of cutting or amount of stock removed per unit of time, (4) coolant, (5) character of the work, (6) machine tool used, (7) the operator's personal equation, and (8) availability of commercial tools and machines of desired kind.

The type of tool frequently imposes limitations which materially decrease the production rate because the desired shape requirements cannot be met. Such an example is sometimes found in the case of circular forming tools with marked differences in the diameters of their contours, where it is frequently quite impracticable to use the desired cutting-edge angles. Again, the cutting edges of the tool may be of the desired shape but the design of the tool may not have ample provision for taking care of the continuous and but slightly curled cuttings that are characteristic of many of the alloys of aluminum. Such difficulties sometimes occur when using certain types of automatic die-heads that are available in the market.

The material from which the tool is made will not only affect the life of the tool but also the cutting rate used. The choice of tool material, be it high-carbon, high-speed or cemented-tungsten-carbide will be governed to some extent by the type of tool, the machine with which the work is to be done and the character of the work. High-carbon steel tools ground to the thin cutting edges desired for aluminum may give an early failure because of brittleness. High-speed steel tools give much better results when machining alloys of aluminum except those containing appreciable amounts of silicon. These high-silicon alloys, however, can be readily machined on a production basis using the cemented-tungsten-carbide tools. Apparently there are differences in the bonding material or degree of bonding in the various kinds of the cemented-tungsten-carbide tools, sometimes in diqfferent lots of the same make. Those kinds and lots which have the greatest toughness seem to give best results in machining aluminum.

The rate of cutting is a function of speed, feed and depth of cut. Each of these may be and usually are closely related not only to each other but also to any or all of the other factors under consideration. If for example, the tool is of the desired shape, very high speeds frequently can be used in machining aluminum, but because of the comparatively thin cutting edges of the tools rather fine feeds with moderate depth of cut, or moderate feeds with small depth of cut, will generally give best results. When the type of tool is such that the desired shape of the cutting edges cannot be used, e. g., the optimum top rake, there may occur a marked curling of the cuttings or chips with consequent increase in the frictional heat developed. Under such conditions a lower cutting speed, smaller feed or depth of cut, or more coolant must be used.

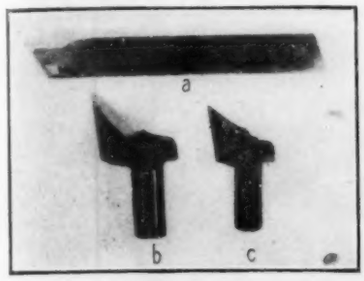

Fig. 2—Standard Tools Reground for Aluminum

The coolant used in cutting metals not only serves to carry off the heat generated during the machining operation but to some extent may and probably does act as a lubricant between the chip and tool as well as between the work and the tool. The comparatively high thermal conductivity of aluminum materially assists the coolant in performing the first of these functions while the nature of the coolant is of more importance in the other. Experience to date has indicated that a mixture of lard oil and coal-oil or kerosene, usually of equal parts, generally will give satisfactory results when used as a coolant. The proportions indicated can often be varied with advantage, depending on the character of the work being done. For heavy cuts more lard oil is used and for light cuts at high speed more kerosene may be used. It must be pointed out however, that satisfactory results are frequently obtained using solutions of soluble oil and water.

The character of the work will affect the results obtained, depending on whether or not the part must have a high degree of finish; must have accurate or approximate dimensions, requires this or that type of tool, indicating machining with lathe, shaper, milling machine, drill press or other machine tool. This fact may be obvious to many, but experience has shown that some of these items are very frequently ignored in selecting speeds and feeds for a given job. If the work must meet close dimension tolerances, appreciable temperature rise must be prevented. This is usually accomplished by resorting to lower speeds or less feed than could otherwise be used.

Machine tools sometimes used in machining aluminum are of such design or in such mechanical condition as to preclude the obtaining of satisfactory results. Worn spindle bearings, lost motion in lead screws or feed mechanism, too much spring in tool posts, arbors or holders, permitting chatter or "hogging in" of the cutting tools are all direct preventives of satisfactory results when machining aluminum. Until somewhat recently many of the machine tools available were not designed to give the high cutting speeds recommended in machining aluminum. The advent of the cemented-tungsten-carbide tools has assisted much in diminishing this difficulty. There are still some modern machine tools however, which do not provide as high speeds as could be used advantageously in machining aluminum.

A machine-tool operator whose experience is of considerable extent but has been confined largely to the machining of brass and steel, is frequently quite reticent about using tools having the extreme shape recommended for aluminum. The more extensive his experience generally the greater his inertia towards using new ideas. Not infrequently difficulties in machining aluminum in a production shop have been traced to this cause. It is necessary that the operators not only understand what the proper tool shapes are but that he use them when machining aluminum.

Until recently most of the standard types of machine tools available in the commercial field were designed primarily to meet the requirements of free-cutting brass or steel. The introduction of the cemented-tungsten-carbide tools has shown the need for higher cutting rates. Accordingly we find much higher spindle speeds, feeds, better bearings and other features that go with the increased cutting speeds, incorporated in some of the newer machine tools. In general these features are all favorable towards the better machining of aluminum.

The machinist is frequently obliged to use commercial types of small tools primarily intended for brass or steel when machining aluminum. That is, the desired type of tool may not be available in the tool room or else it must be ordered as a special which frequently involves too much delay for the job at hand. Either case is unsatisfactory and it is to be hoped that our manufacturers of small tools for cutting metals will point out more clearly in their sales literature the types suitable for aluminum. If this were done an increase in the demand for such tools might reasonably be expected which eventually would warrant such types being carried regularly in stock, not only by the manufacturers but also by the jobbers.

The many factors entering into the successful machining of aluminum that have just been pointed out may appear to make the problem unduly complex but in reality these same factors obtain in any metal machining problem. They are reviewed here in order to emphasize the necessity for giving each proper consideration when machining new metals or using new tool materials. The average machinist is too often prone to accept some of the factors as fixed constants rather than as possible variables in any given machining problem. It is then the province of the production engineer to see that the proper machines and tools are available and of the foreman to see that they are properly used.

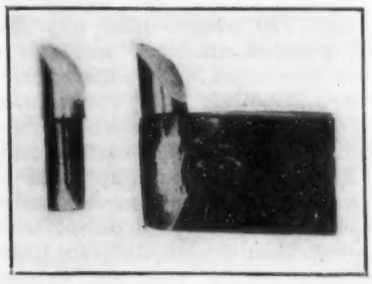

Fig. 3—General Purpose Tools for Aluminum

It is frequently possible to provide tools having the proper shape of cutting edge by merely regrinding available tools of more or less standard shape. The tool bits shown in Fig. 2, are examples of this. Bit "a" is a shaper or planer-tool bit, ground from high-speed steel stock, while bit "b" is a patented drop-forged high-speed

steel bit which has been made suitable for aluminum by simple grinding. Further improvement is obtained by brazing a piece of cemented-tungsten-carbide to the bit "b" as shown in the case of bit "c." The form of tool bit shown in Figs. 3 and 4, is a general-purpose one which is usually made of high-speed steel and can be readily adapted to lathe, shaper, or planer tools, inside boring tools and even face-milling cutters with marked advantages when machining aluminum. This form of tool bit is readily made from round stock and easily resharpened and replaced. Quite a range of settings for different amounts of top and side rake can be made by rotation of the bit or bits in the holder.

In Fig. 5, is shown a face-milling cutter with inserted teeth ground to the desired shape for machining aluminum. The teeth have 45 deg. top and side rake and this cutter has been operated at 350 r.p.m. using 1½ in. per min. feed with a depth of cut of ⅛ in. and a width of 6 in. The coolant used was soluble oil in water and the material machined was cast duraluminum. Under such conditions quite satisfactory results were obtained but undoubtedly they could have been improved had higher spindle speeds been available in the machine and had cemented-tungsten-carbide tool bits been available.

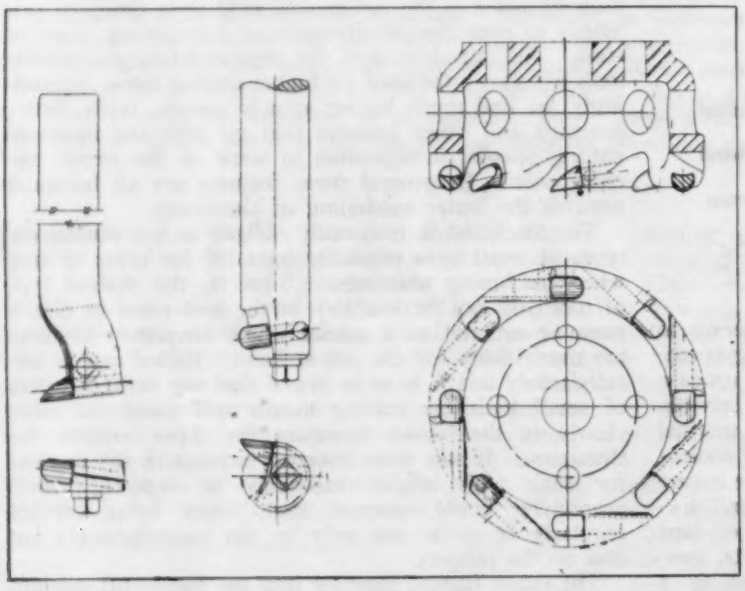

Fig. 4 (At Left)—General Purpose Tools for Aluminum

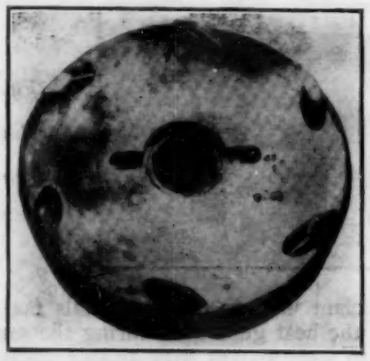

Fig. 5—Face-Milling Cutter with Inserted Teeth

Recently there have appeared on the market circular saws with cemented-tungsten-carbide tipped teeth. The saws are regularly furnished with various amounts of top rake on the teeth, different tooth spacing, two or three styles of cutting edge and swage. The saws with the tooth shape meeting the requirements indicated previously in this discussion are recommended by the maker as being suitable for cutting asbestos composition board, red fiber, cork products, gypsum block, linoleum, plywoods and composition wall boards. Under proper operating conditions however, such saws will cut aluminum much better than the customary type of circular saw. The proper operating conditions call for high speeds (up to 12,000 linear feet per minute or possibly more), comparatively light but positive mechanical feeds—secure clamping of the work and some coolant such as soluble oil in water. Such saws cannot be used successfully in hand or gravity-feed type of sawing machines nor under conditions where the work is not held firmly clamped in place. Light feeds must be used to relieve the strain on the thin edges of the saw teeth and to produce soft chips which will free themselves readily from both the saw and the kerf. A positive feed must be used so that the hook-shaped tooth will not "hog" into the work and thus break off the tips of the teeth. High-speed steel teeth of similar shape and design will give satisfactory results in sawing many of the alloys of aluminum but the high-silicon alloys require the use of the cemented-tungsten-carbide teeth for best results.

The helical type of milling cutters, reamers, and end mills having considerable top rake on their cutting edges continue to give good results in machining aluminum. Likewise in the case of the spirally fluted taps, but in nearly all such tools the cutting edges could be made thinner to advantage. This usually can be done by grinding an increased amount of top rake on the cutting edges.

In conclusion it must be emphasized that many properties other than the machining qualities of the material frequently govern the choice of a metal for specific uses. The production of a part from a metal which does not machine readily when using methods and tools ordinarily applied to other materials therefore, may well call for new methods and tools. Such methods and tools can only come into general use by the close cooperation of the investigator, tool and machine manufacturer and the user.

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Corrosion Tests on Bronze

By H. M. ST. JOHN

THE following problem will be of interest to the brass industry:

We are desirous of making comparative corrosion tests of extruded tobin bronze valve seats as against cast and machined red brass of the analysis of 85 copper, 5 lead, 5 tin and 5 zinc. These valves are used in closet tanks and are subject to corrosive actions of city and town water in various parts of the country.

Could you supply us with the details of a test that we could conduct in our plant and that would be a fair comparison to the results to be obtained in actual installations throughout the country?

A.—It is exceedingly difficult to devise a corrosion test which will give you the information you want with sufficient reliability to inspire confidence in the results. Nothing but actual service experience will give an entirely satisfactory answer to the problem. Corrosion of brass by tap water is influenced by the amount and nature of impurities dissolved in the water, by the extent to which the water is aerated, and by the velocity and turbulence of flow. There is a great variation in the character of tap water used in various parts of the United States, and sometimes comparatively slight variations make a great difference in the corrosion.

A laboratory test for your particular problem should duplicate the mechanical factors of service conditions as closely as possible. The test pieces should be immersed in a specified tap water in a tank so arranged that the water will be violently disturbed at regular intervals. The test pieces should be momentarily exposed to the air at each period of disturbance. It is better to use actual tap water than to attempt making up special test waters to duplicate various possibilities.

Naturally, it is desirable to accelerate a laboratory corrosion test, if possible, in order to obtain useful information at the earliest possible moment. In this case, acceleration by making the water more than ordinarily corrosive would defeat the purpose of the experiment. Apparently the only safe means of accelerating the corrosion is to provide some mechanical means whereby the periodic agitation of the water and exposure of the test pieces will take place at intervals of a minute or two and will proceed 24 hours a day. In this way the effect of aeration and agitation will be intensified. Even this is open to the objection that longer periods of quiet might permit the formation of a protective film which in service might retard corrosion. However, it seems to be the only means of accelerating the test and is probably worth the slight risk.

Measuring the results of the test also offers difficulty. Some qualitative information can be obtained by mere visual examination of the test pieces at intervals during the test, but it is unsafe to draw sweeping conclusions from such an examination unless the differences are very marked. The test pieces may be weighed before and after the test, brushing off all loosely adhering products of corrosion before the final weighing. Pieces which have been brushed in this way should not be used for further testing. If this method is to be used, each piece should be carefully examined to determine the extent of pitting, since a specimen showing a comparatively small loss of weight may be deeply pitted due to severe localized corrosion.

Microscopic examination of a section through the test piece will disclose intercrystalline corrosion or dezincification, neither of which would be so apparent to the naked eye nor so well determined by loss of weight. Another way to measure corrosion which does not result in an appreciable loss of weight is to make up the test pieces in the form of standard tensile test bars. A comparison of the strength of bars not exposed to corrosion with the strength of bars of the same composition but after a period of exposure will indicate the net effect of corrosion of all types.

If you make these tests you will probably find that in some waters either of the alloys you mention will be attacked very little. In waters containing carbon dioxide, particularly if highly aerated, the tobin bronze will be subject to dezincification while the red brass alloy will be comparatively unaffected. In waters containing traces of sulphur the red brass will be attacked but the tobin bronze will be practically immune.

Chilled Bronze Gears

By WILLIAM J. REARDON

Q.—We are desirous of receiving information in regard to making chilled bronze gears. The mixture is to be 89% copper and 11% tin. The chill is only to go around the outside face of the gear.

We would like to know the correct pouring temperature on gears ranging in weight from 25 to 200 lbs. We would also like to know the proportion in weight of the chill to the casting.

We understand the chill is not to be finished on the side where the metal comes up against it, but is to be left rough as it comes from the foundry. Is there any facing used on the chill, and is the chill heated before being set into the mould? If so, to what temperature should it be heated?

Can you give us any information as to how deep a casting can be chilled by using one of these cast iron ring chills? Also, any suggestion you have to offer as to gating would be appreciated. The diameter of these gears would probably vary from 9 inches to about three feet.

A.—The idea of chilling bronze gears is to prevent segregation, and the chill is generally made in one piece. There is no objection in making it three or more pieces, if you so desire, and it is not necessary to finish the chill if you can cast the chill the correct size so the pattern will draw when cast in one piece. The one-piece chill is used more as it prevents seams that will occur if it is cast in sections. The chill should be as wide as the face of the tooth and approximately 2 inches thick.

The chill is not such as you get in iron, but causes the metal to set quickly and with less segregation. As far as hardness is concerned, there is very little difference between the casting made without the chill and one cast with the chill. In machining, very little difference is noticed, if any at all. With a 2-inch thick chill, if the casting is broken the fine grain will show in approximately 1½ inches. The metal should be poured at approximately 2000 deg. F., and with a horn gate. It is best when two horn gates are used, as the metal will enter quickly into the mold. Lard oil is used on the face of the mold to prevent sticking and burning. It is put on very lightly and rubbed well. Smoke from an acetylene torch is also used for the same purpose.

In regard to heating the chill, it is necessary to heat it to remove all moisture. In reference to the proportioning of the chill to the size of the casting, all that is necessary is to make the chill thick enough not to warp, and this thickness has been found, for the general run of gears, to be approximately two inches. As stated, it should be thick enough to prevent warping.

The iron is important and should run as high in graphite carbon as possible; over 3%. The bronze lies better on iron high in graphite carbon and low in combined carbon.

Case Hardening

By H. M. ST. JOHN

Q.—I AM interested in case hardening, and I wonder if the same results are obtained by using sodium cyanide as by using potassium cyanide.

At present we operate a pot of sodium cyanide and use it for case hardening small parts. We use basic wire and heat in a bath at 1530° F., for about 30 minutes. The crust comes out file hard, but can be crushed with a chisel and cut. Is this unusual? The case is about 1/32" thick. We quench in oil.

Could you recommend a reliable book on case hardening that is likely to be of help?

A.—Case hardening by the cyanide process is now done almost exclusively by the use of sodium cyanide, or, rather, sodium cyanide mixed with varying proportions of sodium chloride and sodium carbonate. Previous to the war potassium cyanide was preferred, but at that time, since nearly all potassium salts were imported from Germany, potassium cyanide became very difficult to get and the sodium compound took its place. The latter is much cheaper and seems to work quite as well; hence its present popularity. You will sometimes hear the term potassium cyanide used simply from force of habit when sodium cyanide is really meant.

Your cyaniding temperature seems a little low and your time a little long for best results. More uniform and less brittle results should be obtained by heating at 1550° to 1575° F., for not more than 20 minutes. Some people use a temperature as high as 1600° F., for 15 minutes. The desirable temperature depends somewhat on the carbon content of the steel; the higher the carbon the lower the temperature. The above is correct for a steel which runs about 0.15% carbon.

The hard case on any piece of case hardened steel can be cut through if sufficient force is used, simply because the softer steel underneath the case gives way and the thin case, which is comparatively brittle, breaks. If the above recommendation as to time and temperature is followed, the case should be somewhat less brittle and less inclined to crumble.

We do not know of any up-to-date book confined to the subject of case hardening. "Steel and its Heat Treatment," by D. K. Bullens, published by John Wiley and Sons, New York, gives a comprehensive discussion of all types of steel and varieties of heat treatment, including a brief description of the cyaniding process. This book can be ordered through THE METAL INDUSTRY.

A Brass Foundryman's Progress

How a Boy Grew Up to Be a Brass Foundryman. His Adventures, Joys and Sorrows, as Told to W. J. Reardon.—Part 5*

By OTTO GERLINE

Gerline Brass Foundry Company, Kalamazoo, Mich.

DEAR BILLY:—

When last I wrote you I believe I got as far as the South Erie Stove Works, where I had a job at 50c per day of ten hours. It may be interesting to you if I gave you a few sidelights on this job.

Of course, I was green and had no idea what shop work was like, or what it was all about, so I guess 50c per day was all I was worth to the firm. This amount, however, did not go far enough to pay all my bills, so I got a job helping a fellow who had a paper route, delivering the Erie Morning Dispatch. In this way I earned 25c per day more. I would get up about 3:30 A.M., be at the Dispatch office, then located on South Park Street, at 4:00 A.M., and deliver papers until 6:00 or 6:30 A.M. Then would come breakfast (and what an appetite!) and the shop. After supper I would bring out the shoe shining box and start out to earn some more money. Sometimes I would earn nothing at all in an evening (rainy and cold nights I mean), and sometimes I would do real well earning; one particular night as much as $1.32. The average extra I earned by shining shoes was about 30c to 35c per night, so you see I earned the total sum of 7x25=1.75, 6x50=3.00, and 7x30=2.10, or $6.85 per week, working about 18 to 20 hours per day, 7 days*; some weeks a little more, some weeks a little less. I paid $3.00 per week for my board, and the lady did my washing and mending. Not so much washing as mending. I didn't have a lot of clothes to wash, but I always had something to mend. Getting on my knees shining shoes, and fighting with the other roughneck "shines" was hard on clothes. The lady, however, was a good-hearted old Irish soul, and never complained. In fact she wanted me to kill a few of the "daygoes" as she called them. Anyway, I was making money enough to get along, and if I ran behind when I bought a new suit of clothes she said she would charge it to me until I earned enough to pay her. God bless the Irish, Billy. They helped me a lot, and I assure you I have a warm spot in my heart for them to this day, and that includes you.

The job at the stove works consisted first of sweeping the floors, washing windows, pushing a wheelbarrow, and grinding castings, and incidentally my fingers. I got along well for a while until one day the foreman gave me a job grinding stove lids. He told me to be very careful not to grind anywhere only where the gate or runner was broken off, and also to be very careful and keep them perfectly round. I ground a lot of them, and as I wanted to make an impression on this particular foreman I worked fast and pushed hard against the wheel, with the result that they all showed a flat spot where I did the grinding, and they all had to be scrapped. He didn't fire me, but he said plenty to me. He put me back to grinding grate bars. These were not so particular. I was so interested in this stove business that sometimes I neglected my own work and walked through the shop watching the other men do their work. Every now and again someone would take me by the ear, turn me around and plant a swift No. 10 shoe where it did me the most good. It was my foreman, and it is too bad that Knute Rockne could not have this fellow for his drop kicker. I believe he would have made a star.

I was next shown how to dress an emery wheel after it became worn round, or full of grooves on its face. We used the old black diamond style dresser, with a rest. I got away with this act several times in good shape, until one day I made the fatal mistake of letting the tool get between the wheel and the rest. The wheel did not like this kind of treatment, and disappeared. One part went out through a side window, being careful to take the sash with it, and the other part went out through the roof. There was no one hurt, but I lost my job, momentarily.

Next evening I went to the foreman's house, who by the way used to be one of my milk customers, and crying, begged him to give me another chance. With the help of Mrs. Rehm, who felt sorry for me, he said he would see that I would get a job, not in his department, but in the foundry. That was O.K. with me. He gave me a glass of sweet cider, and Mrs. Rehm gave me a few cookies before I left, and the world looked bright to me once again. The job in the foundry was under old Mr. Atkinson, and my job was hauling wood, hard coal, scrap and pig iron to the cupola charging door, up a steep incline, as we had no elevator. This was pretty stiff work for a kid, but I did it. I quit shining shoes nights, however, as I was too tired. He raised my pay to 75c per day, so I had nearly as much as before. Whenever I had a minute to spare I would watch the molders work, and, this, to me, was the most fascinating work I had ever seen done. I couldn't get enough of it. I guess it was right here that I made up my mind to become a molder. These molders were working piece work, and would work through noon hours and I would eat my lunch between eleven and twelve o'clock so that I could watch them, and help them during the regular dinner hour. Some of these molders told me to go away and stay away, but some of them were glad to let me help them shovel sand and close the larger molds, and the blacker I got from shaking the charcoal facing bag the prouder I felt. So you see, Billy, my molding career really started in a stove plate foundry.

Later on I got fired for neglecting my regular work, and watching the molders, and as Mr. Atkinson was not like Mr. Rehm, **I stayed fired.**

About this time the first matches, other than the old sulphur matches, came out and I went to peddling matches from house to house. I didn't do very well, as the commission was very small, and the matches sold very cheaply. In this way, however, I got acquainted with Mr. John McConnell, who was then foreman of the Jarecki Manufacturing Company's brass foundry, and he told me he

*Parts 1 to 4 were published in our issues for July, 1929; November, 1929; May, 1930, and August, 1930.

*I almost forgot to mention to you that the balance of the time belonged to me.

would give me the next chance he had to work for him. A few days later I went to work, and my first job was running or attending two "rattlers," as we called them there. Water tumblers or rumblers is the correct name for them, I believe. As for myself, I still call them rattlers, and the castings we don't standblast we "rattle."

I was green as grass, and still called molding sand "dirt" at that time, and took a lot of kidding for it later on. Right here it may be proper to say something of interest to the beginner, or even to the man that thinks he knows all about running "rattlers." When I took this job the floor around these "rattlers" was covered with about 6 in. to 8 in. of scrap metal, and some that had fallen on the floor and was never taken proper care of. I got a pick and shovel, dug it all up, washed it all out in a tube of water, through a No. 12 riddle and recovered several hundred pounds of valuable metal. I next cleaned the rattlers, took up the bearings, tightened the belts and put in more castings to a load than was done before. (This I learned in the stove shop.)

They had eight molders at the time and were far behind with the rattling of the castings. Useless to say, no doubt, that castings made out of strictly new metal, such as globe, angle, radiator, gate and other valve bodies were not rattled. We used the skimmings to put in the rattler with the castings which served a twofold purpose, namely clean the castings and to clean and recover the metal out of the skimmings. This I believe to be good practice to this day in a small foundry, where a crusher and redeeming machinery would mean bankruptcy.

I learned here that the valve bodies were poured and timed for a natural color effect. The metal was poured and the molder would look at the clock and take the time. The boards would be kept on the molds so as not to let the heat escape, and to keep cold air away from the castings. After two minutes, or twelve minutes, etc., according to size and weight of the castings a man would lift the cope, the molder would quickly grab the gate, or sprue, with a special pair of tongs, tap the runner or sprue with a clamp, so as to loosen all sand around them, hold it exposed to the air for a fraction of a second or more, and dip it into a tank of cold water, and hit it a sharp blow against the side or end of the iron tank, when an explosion would take place and the sand would be blown out of the casting, clean as a whistle, as they say.

There is quite a trick to this operation, and if done right a beautiful color can be put on valve bodies and other castings where a natural color is desired. Of course, every one knows about this and I simply mention this because of the other castings, such as valve bonnets, gas cocks, pet cocks, etc., which at that time were not "blown out" in this foundry. This made a lot of work for the man that took care of the "rattlers," as he had to hammer all the cores out of this sort of casting before he could put them in the "rattler."

I asked Mr. McConnell why they didn't blow the other castings, as it would save me a lot of work. He said "They never did it, and I suppose they would kick if I told them to do it." I asked him then whether or not he would allow me to blow them and he said "yes." The molders "beefed" about it for a time, but soon helped me to blow out their castings, and shortly after that they did it all alone, as they seemed to like the looks of their heats much better if done in that way. This saved me half the work, and I soon caught up with the molders, and I also had my "rattlers" looking like a new Ford.

There was another thing in connection with the rattling of the castings that took a lot of time, and which I overcame as a kid, and that was this. It was the practice then to throw the castings and scrap into the "rattler," let them run a certain length of time and then wash the castings out in a bucket of water. In such castings, as bonnets, pet cocks, etc., it took a long time to empty a rattler and I worked out the following scheme. I would fill my "rattlers" with the floor scrap and skimming, and throw in several pieces of pig iron. I would let them run until I got rid of most of the sand, and the larger pieces were clean enough to remelt. I would then empty my "rattlers" and riddle all the scrap left in them through a one-half inch riddle. I would take the larger pieces to the man that attended to this part of the metal and put back in the "rattler" the metal that passed through the one-half inch riddle. I would then rattle the castings with the regular door clamped on, but instead of picking all these castings out by hand I had a door made, drilled full of three-quarter inch holes. I would now change doors, turn on the water and start the "rattler." As you can readily see all the scrap came out of these holes and the castings stayed in the "rattler" good and clean. I would then push the scrap back out of the way and proceed to pull the castings out into an old riddle and dump them in a box. This operation saved me over 50% of time, and it was done better, and cost but 75c for the special door. Of course, it is understood that delicate castings that are likely to bend, or castings that were polished and could not be nicked in the slightest should not be handled that way. Castings smaller than three-quarter inch I handled by putting scrap through a quarter inch riddle, and after being rattled put them through a half inch riddle, which would let the scrap go through and leave the castings in the half inch riddle to be dipped in a tub of water to rinse off all fine particles. And so a lot of time could be saved.

We are doing this in our foundry to this day, and it is about forty-six years ago that I first got this idea. If this is worth anything to anybody they certainly are welcome to it. It got me a raise to $1 a day.

Mr. McConnell, the foreman, inspected all the castings before they went upstairs to the finishing room. After I got this "two door" and "blow out" system going I could help him inspect castings, and bye and bye my friend Johnny let me do it all. I was now a full-fledged Inspector, and rattler operator of the first class, and Mc Connell's pet. I learned here to tell bad castings from good ones, and also learned about blows, shrinks, wet sand, etc., which came in handy later on, believe it or not. Let me know if you think this kind of stuff will help beginners. If you think so I will try to give a few more along these lines.

To the man or boy starting in the brass foundry business I would say if you are not in good health, and love hard work, stay out of it.

Later in following up the brass foundry game these little things came in very handy to me, as I could show a green hand how to do it, as well as tell him how it should be done. A man will never, to my notion, make a good foreman unless he can personally show other men how a thing should be done, and done right. It is a good practice, I believe, to take the sand that accumulates in the tank and let it dry, then riddle it through a No. 12 riddle. You may be surprised at the amount of metal you recover in this way. The sand and metal that goes through the riddle can be sold to a refinery as rumbler mud. Of course, you will not get much money for this, but it all helps, and in this way you will lose but very little metal in your foundry, especially a small jobbing foundry where buying and installing crushers and reclaiming machinery is out of the question.

If a "rattler" or rumbler is run right you can save all metals from skimmings and floor sweepings for remelting, and your castings can be cleaned economically.

I have been taxing my memory now for about five hours, and it is 3:00 A.M., so I am going to quit, and say Good-night, or better Good-morning to you, and remain as ever, your friend.

The Problems of the Metal Industries

By ADOLPH BREGMAN

Managing Editor

A Discussion of Some Important Technical and Commercial Difficulties Which Beset Various Branches of the Trades Manufacturing and Finishing Metal Products—Conclusion*

THE secondary nonferrous metals have grown to manhod in industry. Once they were the bad boys, then growing larger, but only a little less unruly, the wild young men. But now their wild oats have been sown. The trade is becoming stabilized and mature. No longer do the important factors scoff at the idea of technical control, chemical analysis and standard specifications. They are not only accepting advice but they are actively engaged in research and the improvement of their technique and trade practices. No longer are ingot metals and alloys sold on the "as is" basis. Generally they have specified compositions at prices comparable with those of new metals, and the element of quality has assumed its proper importance.

Standard Products and Methods

This transition has brought with it the usual pains of settling down from a gay youth to a sober middle age. Scrap metals can no longer be used to "make a cleanup and a getaway." The producer of ingots is a business man, and more often than not, a large business organization, creating good will by its quality and service. It has been faced with the demands of the consumer for stability and trustworthiness in its product. It has, therefore, joined hands with the American Society for Testing Materials through its several organizations, such as the Non-Ferrous Ingot Metal Institute, the Aluminum Research Institute, the National Association of Waste Material Dealers and the White Metal Institute. The Department of Commerce has also taken an active interest and is conducting an extensive survey of secondary copper.

The problems of the industry are not yet solved. Among them are the need for standard specifications for ingot metals giving definite limits for impurities and standards of quality. Such a set of specifications has, however, been drawn up and published as tentative, awaiting comments from the trade before it is made standard. It then remains only for the larger and better elements of the trade to make its adoption general as they will be followed by the rank and file.

Standard methods of analysis should be developed to avoid discrepancies between the payments asked for and offered for scrap. Such methods are being worked on by the Aluminum Research Institute for aluminum, and their work should serve as a guide for other branches.

Some of the commercial problems are in a measure outside of the control of the industry. Fluctuations in the prices of virgin metals are paralleled by scrap, which lays the secondary industry open to the dangers of constantly gambling with its inventory.

Additional Technical Problems

The secondary metal smelter is confronted with new technical problems almost every year. Alloys are constantly changing, new combinations are constantly appearing and they are followed shortly afterward by the appearance of new types of scrap on the market. Aluminum bronzes, silicon bronzes, for example, and others are becoming increasingly popular. Their appearance in the form of scrap is a very complicating factor as they are often difficult to recognize in sorting, and their purification or use in making different mixtures necessitates the continual search for new methods.

Profit margins in this industry have been low for some time under the steady pressure of a declining market and the severe competition. But the industry can point with pride to the fact that it appreciates the gravity of its difficulties and is organized to grapple with them.

PROBLEMS COMMON TO ALL BRANCHES OF THE METAL INDUSTRIES

Throughout the different, and in many ways dissimilar, branches of the metal industries, runs a thread which joins them all. Some problems are universal.

Stabilizing Trade Practices

Illegitimate price-cutting is probably the greatest commercial evil in existence. Business is prohibited by law from fixing prices by agreement. At the same time we have the fact that competition under present conditions is not only unfair but positively dangerous to the existence of industry. How then can this evil be cured? The consensus of authoritative opinion seems to be that the following measures would be effective and can be applied:

1. A standard cost system to be used throughout each industry, modifiable to suit individual needs.
2. Standards of quality which will allow a fair basis of comparison between low and high prices.
3. Standard testing methods to check these different qualities or grades.

An evil so widespread will not be cured overnight. There will always be a small unruly element to contend with in every line of business. But if the leaders of an industry subscribe to and live up to these measures, it will take care of the bulk of the business done, leaving only the fringes to the outlaws and greatly restricting the harm they can do.

Automatic Material Handling

The technical problems of each specific trade and division of each trade are generally peculiar to itself, but the factor of material-handling is common to all. During

* Concluded from the issue of January, 1931.

the last decade more progress has been made in cutting costs in material handling than in any other single department. The belt conveyor, the hopper, the overhead trolley, the crane, the hoist running on a monorail, the electric truck and a dozen other elements have combined to eliminate waste and save unnecessary labor. This development is still young and growing lustily.

Broad Business Problems

Those problems of the metal industries which arise from the problems of general business, general price declines, over-expansion in boom times and consequent suffering in depressions, can be cured only by the application of broad, general methods which must emanate from authority either higher, or more centrally located than the individual trade.

We have not yet learned, here in the United States, to restrain our enthusiasm when the weather is fair. Some day we may be able to hold ourselves within bounds to keep from over-stepping and to avoid the pitfalls due to blind optimism. Some day we will find a way to prevent unemployment. Whether this will come through the wisdom of great leadership in our government or the co-operative action of business in general, nobody knows.

The great unsolved economic problem of our age is keeping business on an even keel.

Plating Silver on Plaster

Q. I AM attempting to deposit silver on dental models made of plaster of paris. Can you tell me how I can make the silver deposit adhere directly to the plaster in such a way that it will reproduce the surface of the model? I have tried graphite on the plaster, without success. The silver is not expected to remain permanently on the plaster, but it must cover the plaster model perfectly in order to make what is known as a baseplate for a denture. I have had some models plated outside and they were done apparently without the use of copper on the plaster.

I would like to know how this work can be done. Please give full directions as to electric current, preparation of plaster surface, etc.

A.—The electroplating of plaster molds has been common practice for a number of years by some progressive dentists. A number of papers have been published upon this subject in the several dental magazines.

A good method to follow is to impregnate the plaster mold with a wax. This is best done by placing the wax mold directly in contact with some molten wax, so that the capillary attraction will draw the wax up through the plaster cast. This is better than immersing the plaster cast in the molten wax as it prevents a heavy coating of wax on the outside of the mold. After the plaster has been saturated, any excess is taken off by warming the mold and removing the wax by wiping. This is then given a coating of shellac.

Another method would be to shellac the plaster mold. This is best accomplished by making an exceedingly thin solution of shellac and alcohol. The object of using a thin shellac is to permit the plaster to absorb the shellac rather than to form a heavy coating of shellac on the outside of the wax, which would prevent impregnation.

After preparing the plaster by either of these methods, the surface can be sprayed with a tin bronze powder and a lacquer practically free from gum. Such a lacquer can be obtained from any manufacturer of lacquer. A coating of shellac can be painted on with a brush and then, while still tacky, the tin bronze powder rubbed in. If the tin-bronze powder is objectionable, a silver-bronze powder should be used. It would be best to have this powder free from grease.

After the bronze powder is applied, the article should be allowed to dry thoroughly in the air; no heat should be applied. It then can be placed in a cyanide silver solution. This solution should be rich in silver and low in free cyanide. It can be made with five and one-half ounces of silver cyanide, eight ounces of potassium cyanide and three ounces of potassium carbonate to each gallon of water. A current density of about five amperes per square foot of work surface, at one volt pressure, should be used.

The plaster object should be held firmly by some supporting piece of metal for an electrical connection. This should be rigid. The bronze powder coating will be very soft and can be easily scratched, and where it is abraded there will be no deposit of silver.

This process seems complex, but after a few experiments it will be found quite simple. G. B. H.

Removing Composition from Aluminum

Q.—We are sending an aluminum salt shaker top which we have polished with crocus, leaving some dirt or discoloration on the inside.

We would like to have you advise as to the best method of cleaning the inside. We would, of course, like to accomplish this without affecting the polish on the outside.

A.—As it is impossible to remove the polishing composition in a strong alkaline cleaning solution due to the action of the alkali on the aluminum, we would suggest that you use naphtha or gasoline. You might consult some of the metal cleaner manufacturers who advertise in BRASS WORLD. You need a product that will not attack aluminum.

We believe that the stain and polishing compound can be eliminated by using a properly made holder when the polishing operation is performed. This could be made by placing small steel pins on the end of a round piece of wood to fit into the holes in the article and would prevent the polishing compound from entering the holes and staining the inside. OLIVER J. SIZELOVE.

Bronze on Brass

Q.—Will you kindly advise if you know of any bronze dip solution that could be used for producing a finish such as on ferrules like the sample we are sending you.

A.—There is no dip bronzing solution that we know of whereby finish on the sample submitted can be produced. The sample is made of brass and the sides have been polished on a No. 150 emery polishing wheel, used dry. It was then bronze plated and scratch brushed. The sample has not been lacquered, but it should be to prevent tarnishing. OLIVER J. SIZELOVE.

Plating and Finishing Electric Irons

A Detailed Description of the Shop Operations Involved in Turning Out Chromium Plated Electric Irons from Cast Iron and Sheet Metal Parts

By T. C. EICHSTAEDT

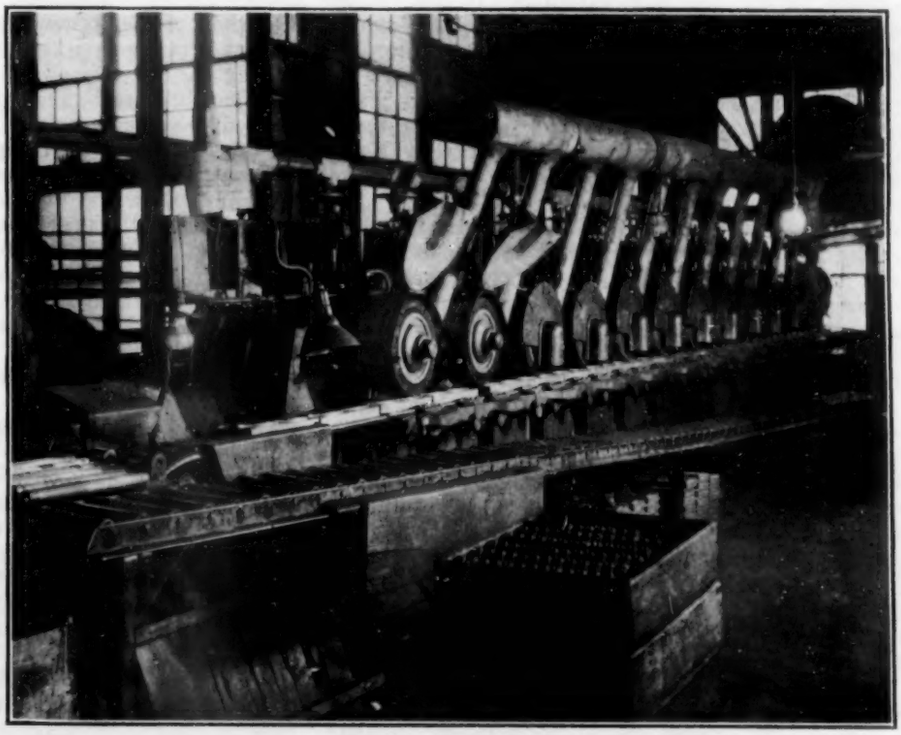
Electroplater, Detroit, Mich.

THIS article is not written with any idea of bringing out anything new in the process of polishing or plating of iron and steel, but simply to set forth the most efficient and economical process for finishing them. I shall, therefore, be as brief and explicit as possible in doing so.

Sad, or flat irons, of course, are made of cast iron bottoms or "shoes" as they are commonly called. These shoes, after casting, are sand cleaned by either tumbling or preferably an automatic sandblast, not being pickled at all. Pickling used to be the process of cleaning the sand from these shoes, but on account of the acid penetrating the castings, they gave considerable trouble in the plating. After the sand has been cleaned off, the pieces are milled, top and bottom. The top is milled for no particular reason except to give a smooth clean and flat surface.

After the milling and edging, the pieces are drilled and tapped, and then polished on the edges by hand. As no automatic polishing machine has been developed for this purpose as yet, No. 80, 120 and 150 emery are successively used for this operation. After the edges are polished, the shoes are then polished on the bottoms on an automatic polishing machine.

There are three types of these machines. One has 22 or 23 wheels which travel at approximately 2,000 R.P.M. They are connected in pairs on a swinging arm traveling back and forth. The work or shoes are placed on an endless belt which has fixtures fastened on it that hold the shoes in place. These 22 wheels are generally made up of cloth buffs, 3 to 3½" face, 14" diameter, set up in the different sized emery or abrasive, the first wheels being No. 80, the next 6, No. 120. These wheels are used dry; there is no grease or oil used on them. Then the next 4 wheels are No. 120 oil or grease wheels. The next six wheels are No. 150 oil wheels. This is an old type of automatic polishing machine. The wheels travel backward and forward over the shoes going through under them on the endless belt, in fixtures.



Flat Iron Shoes in Process of Being Polished by an Automatic Polishing Machine. The Work Runs on a Belt, Receiving Treatment from Successive Sets of Various Types of Abrasive Wheels

Then type No. 2 is a machine more modern and far more efficient. On this type of machine the shoes are put on the endless belt or chain in fixtures holding 3 or 4 shoes. The wheels are set on individual motors mounted parallel with the belt or chain and the shoes

traveling directly under the wheels, which are directly connected with the motor. The table on which the belt or chain travels is stationary. The motor and wheel are adjustable and are also fixed with a tension or pressure, each wheel being individually set and adjusted. One can have as many wheels as is necessary for finishing the shoes. On this machine as well as on the other type mentioned, there must be at least two operators as they are one-way machines. One operator places the shoes on the belt on one end of the machine and another operator takes them off the other end. Then there is a gravity roller or slide runway for the second operator to return the fixtures to the loading end. It is necessary to have two or three other operators to take care of changing wheels, keeping the proper tension, grease, etc., on the wheels. It is not necessary to shut down the whole machine to change wheels as each wheel is on an individual motor and changing wheels can be going on continually.

Then there is the circular type of automatic polishing machine. This is one where the wheels are mounted with individual motors in a circular position. These are generally made with six wheels, but can be made with as many wheels as necessary. The belt or chain travels in a circle also and the shoes are taken off and placed on this belt or chain at the same place. One needs no fixtures. They can be held with a magnetic chuck, thus saving types of machines the wheels can be run straight or oscillated, but they are generally oscillated.

So much for the polishing, except to say that the all important part of this operation is to have the proper number of a certain grain of abrasive to give the proper cut. This is most important on the first wheels to make sure that all the milling marks are taken out before they go to a fine wheel, as all the finer wheels are for is to take out the marks of the rougher wheels. There should be no milling marks left for the fine wheel to take out.

Polishing wheels should be of the right kind for the different grain of abrasive, they must be kept in balance and run absolutely true. Another important part of the whole polishing operation is that a good abrasive glue must be used (the best abrasive obtainable). A stock of wheels should be kept, large enough so that all wheels can have the proper time to dry properly before being used again, which should be at least 24 hours and better still, 48 hours, not in an oven or dryer. A dryer or an oven should never be used to dry polishing wheels. One should, however, have a room in which the atmosphere is dry, but not excessively hot. A good temperature is about 70 to 80. The care of glue is also very important. It should never go over 150 deg. F. and the abrasive should also be kept at about 140 deg. F. The roughing wheels can be made up of sewed buffs if made properly, but the writer recommends the use of compressed canvas wheels for all operations. Use the extra soft for roughing, the soft for fining and the medium soft for oiling and finishing. This is for flat iron shoes (made of cast iron). A soluble grease should be used to facilitate cleaning them before plating.

The shoes should be carefully inspected, then racked, ready for plating in a full automatic conveyor plating machine. The first tank should be a cleaning tank connected with an electric current direct, using the tank as an anode. Any good commercial cleaner should be satisfactory for this operation and the shoes should be in this tank with the current on at least 2 minutes and better still, 3 minutes. It should be at the boiling point constantly, and thermostatic controlled for best results. The next tank should be a hot water rinse or else have a hot water spray through which the racks travel on the conveyor, then a cold water spray and then a lead lined tank for a hydrofluoric acid of 10 to 15 per cent strength. In this solution the shoes should have at least 2 or 3 minutes, then another cold water spray and then directly into the nickel plating tank. A hot nickel solution of the following composition can be used:

Nickel content—6 to 6½ oz. per gallon pH—5.8 to 6
Chloride content—2 ozs. per gallon.
Boracic acid—2 ozs. per gallon.
Magnesium sulphate—2 ozs. per gallon.

Temperature 110 to 115 degrees F., 35 to 40 minutes at 3 to 4 volts pressure; 15 to 20 amperes per sq. ft. of surface; 99% + anodes. The solution should be under constant filtration. A constant check must be kept on the cleaning solution, the acid dip and also the nickel solutions in order to keep them at standard. It is much better to run a cleaning solution a given time and then dump it than it is to add new cleaner compound to an old cleaning solution. The same thing holds for the acid dip.

After the shoes are plated, they are run through a cold water rinse, or spray and then through a hot water rinse. They are then taken from the plating racks, stacked in bins and transferred to the buffing room. The nickel should be soft but must be buffed hard and then colored. This can be done in one operation, but should be done on two wheels. The spindle for the purpose can be a long one with two buffing wheels on it; for cutting down, about 16 inch sewed buffs, 2½ to 3 inches wide, while the coloring wheel should be a smaller one, say 10 to 12 inches diameter, about 4½ inches wide in order to cover the whole of the bottoms at one time, otherwise there will be laps, shading or waves which will show in the chrome plating.

After they are buffed and colored, they should be inspected, wiped and racked for chrome plating. They need no other cleaning than wiping, but can be run through a cleaner with current direct, same as for nickel plating. Rinse in cold water, then in a muriatic acid dip of 8 ozs. to the gallon, then cold water and into the chrome tank for 1½ to 3 minutes, 6 to 6½ volt pressure; chrome solution 60 to 66 ounces chromic acid per gallon, 0.6 to 0.66 ounces sulphuric acid per gallon; temperature 112° to 120° F. From the chromium solution the parts go into a drag-out tank which is used again to replenish the chromium tank, then into cold water with approximately ¼ ounce caustic soda in it and then into boiling hot water with steam running into it constantly. Then unrack, inspect and buff. You may get some shoes that will not need buffing of the chrome, but the majority will need buffing, so it is best to buff them all. You may also find some not covered with chrome. These will have to be racked chrome plated again.

The most important part of this whole process is the cleaning for nickel plating. The next most troublesome part of the process is in keeping the nickel from pitting or having a rough deposit. The buffing and coloring are the next important operations, for if this is not done properly, you will never have a chrome plate that will buff up clear.

The hoods for electric irons are generally made of steel stampings and drawn. These are polished in two operations, No. 120 emery to take out die marks and burrs and No. 180 emery, oiled all over. Both of these wheels are of the soft compressed type. The 120 marks are crossed by the 180 and lots of grease is used on both operations in order not to burn the hoods. When the abrasives once burn the hood it is very hard to get the marks out and burning also wears out the abrasive on the wheel.

The hoods are inspected after polishing and then racked for plating. They are plated by the same process

as are the shoes and then cut down and colored in nickel. On account of the hobs in the hoods, there will be quite a lot of lime coloring compositions caked on the inside of the hood. After inspecting and before racking, this should be scraped out, then the hood is wiped and racked and these must be run through the cleaner and acid, etc., then into chrome solution at 6 volt pressure, 2 to 3 minutes, then unracked, inspected, chrome buffed and inspected again after buffing, before assembly.

It may be possible to get some hoods out of the chrome solution that need no buffing but I've found it better not to try this but to buff them all.

The handle brackets are also made of stampings and are cleaned in a heavy duty hot cleaner, rinsed and then burnished in a burnishing barrel, one hour with a special mixture of soap chips, 25 pounds; 12½ pounds soda ash; 3 pounds sodium cyanide, to a barrel of 50 gallons of water.

One quart of this solution is used to each barrel holding practically ½ bushel of work and one and one half bushels of burnishing balls. Then they are nickel plated in a plating barrel, 2 burnishing barrel loads, 1 bushel of work at a time for one hour and then burnished again in a barrel, 40 minutes with some soap solution mixture as for previous burnishing. But care must be taken in cleaning off the soap solution before plating, otherwise the work will blister.

The procedure of rinsing steel burnished work before nickel plating is as follows. Rinse with cold water hose while separating from balls. Then in basket run through cleaner heavy duty, then cold water, then sulphuric acid, 8 to 10 ounces per gallon. Let the work hang in this for 2 or 3 minutes. Then cold water rinse, then cyanide a minute or two (8 ounces of cyanide to a gallon). Then cold water rinse twice and shake well in both waters, place in plating barrel and run barrel without current for two or three minutes. Plate for one hour or one and a half hours. After burnishing again, the parts are dried in sawdust and racked for chrome plating. They are run in the chrome solution for one and a half to three minutes, inspected, chrome colored, inspected again and then assembled.

The heel rest for electric iron is made of stamped and formed steel. These are of a peculiar shape and cannot be polished without paying an exorbitant price therefor. They are burnished in barrels, only 50 pieces in a barrel for one hour, rinsed, dried and racked for plating. On account of their shape they cannot be plated in a plating barrel and for the same reason, they cannot be burnished after plating. Therefore, they have to be hand colored. A special rack had to be designed for chrome plating these, eight on a rack. There is no difficulty in chrome plating these or even nickel plating them except that you run them only 12 minutes in the nickel. These need not be chrome colored but must be wiped off, so we just have them wiped off on a buff.

Handle bolts, nuts and handle bracket nuts are all polished by hand, on the heads only, cleaned in gasoline and cleaner, rinsed, acid-dipped and rinsed again, cyanide dipped, cold water and barrel plated one and a half hours; then rinsed in cold and hot water and dried in sawdust and hand buffed, racked and chrome plated in the same way as the handle brackets. These need no chrome coloring as the racks are constructed so that they do not burn.

The barrel nickel solution is made up of 32 ounces of single nickel salts, 4 ounces boracic acid, 4 ounces magnesium sulphate, 4 ounces ammonium chloride, 4 ounces sodium chloride. No brightener is used in this solution on account of chrome plating afterward. pH of 5.4 to 5.6 is maintained. A brightener can be used and bright nickel produced, needing no burnishing.

Bureau of Standards Plan for Buff Simplification

AS A RESULT of a general conference in 1929 of manufacturers and users of buffing wheels, progress has been made by the Bureau of Standards, United States Department of Commerce, Washington, D. C., toward simplification of sizes of full disk buffing wheels. The Bureau has issued Simplified Practice Recommendation R115-30, on Full Disk Buffing Wheels. The following is quoted from the recommendation:

On October 7, 1929, a general conference of manufacturers, distributors, and users of full disk buffing wheels drafted a simplified practice recommendation. The industry has since accepted, and approved for promulgation by the Department of Commerce, this recommendation which establishes the following ply, and simplified list of diameters for full disk buffing wheels:

Ply	Outside diameters, in inches
20.....	4, 5, 6, 7, 8, 11, 13, 14, 17, 18, 20

This recommendation is effective from January 2, 1930, for new production, and thereafter is subject to annual revision by the standing committee of the industry. A period of one year, from January 2, 1930, to January 2, 1931, is provided for the disposal of current stocks of eliminated varieties.

Promulgation recommended.

EDWIN W. ELY,
Chief, Division of Simplified Practice.
GEORGE K. BURGESS,
Director, Bureau of Standards.
R. P. LAMONT,
Secretary of Commerce.

Complete copies of Recommendation R115-30 may be obtained from the Superintendent of Documents, Washington, D. C., for 5 cents each.

Brightening Aluminum

Q.—Can you tell us if it is possible to bright-dip aluminum to give it a bright, shiny appearance such as is obtained on brass when it is shine dipped?

A.—It is impossible to produce a bright finish on aluminum by a dipping process such as is used on brass.

OLIVER J. SIZELOVE.

Corrosion Exfoliations on Aluminum Sheet

Sprayed Molten Alumium Coatings a Remedy

By DR. LEOPOLD PESSEL

Metals Coating Company of America, Philadelphia, Pa.

WHEN rolled aluminum sheet is exposed to salt water spray, the ordinary form of corrosion is of the surface pit type. The accumulation of aluminum hydrates of varying water content soon dulls the surface, although certain sections retain their original luster for a surprisingly long time. This can be explained by assuming that these bright spots are made cathodic areas by the formation of an extremely thin oxide film on the surface of the aluminum. After continued exposure to the salt mist, however, there appears another form of corrosion which seems to be more destructive to the mechanical properties of the attacked sheet. Elongated, blister like exfoliations make their appearance, which very plainly follow the direction of rolling. The surface of these blisters is only little corroded and offers a shiny appearance. When opened with a sharp instrument, they are found to be filled with a white substance, apparently aluminum hydrate.

The fact that these exfoliations occur along the direction of rolling offers the first explanation of this phenomenon. Their origin lies probably in microscopic fissures created by mechanical strains of cold rolling, perhaps in conjunction with segregations of impurities of the metal. This weakness seems to be more pronounced immediately under the surface than on the surface itself. Such fissures would permit little access to the oxygen of the air and become the anodic areas of an oxygen concentration cell. The consequence is the formation of a rather voluminous accumulation of aluminum hydroxide within these fissures, which raises the metal and continuously enlarges the cavity.

After having come to the conclusions that this type of corrosion is clearly electrolytic in its nature, it was only natural to think of a remedy which has shown its efficacy in another case of electrolytic corrosion. The intergranular embrittlement of duralumin, which is presumably caused by galvanic action between the hardening particles of the copper-aluminum compound and the metal grains, is effectively prevented by spraying molten aluminum upon the surface of the aluminum alloy. The principle of such a galvanic protection by aluminum as an anodic metal is already widely employed in the construction of aircraft.

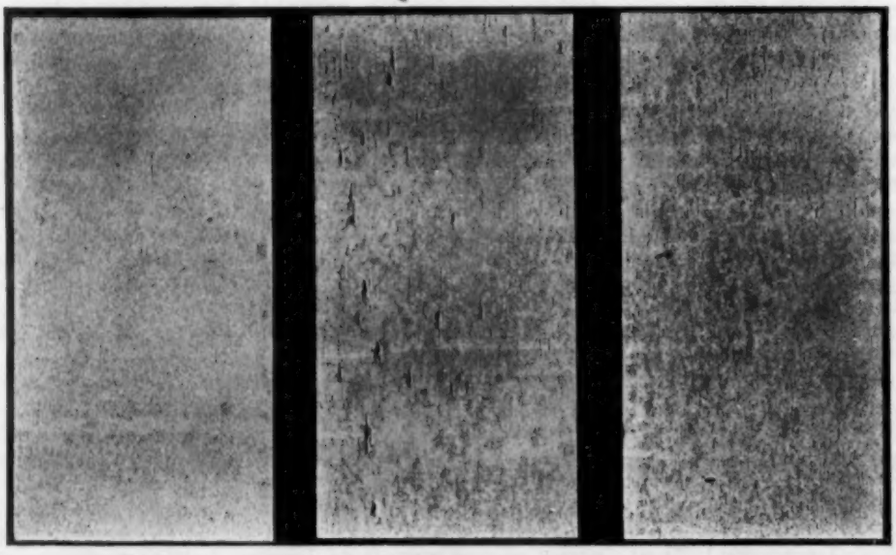


Fig. 1 Fig. 2 Fig. 3

SPECIMENS OF ALUMINUM SHEET AFTER EXPOSURE TO SALT WATER SPRAY CORROSION TEST

Fig. 1—Aluminum Sheet Sand Blasted and Sprayed with Molten Aluminum

Fig. 2—Aluminum Sheet Sandblasted

Fig. 3—Aluminum Sheet Unprotected

It was thought that by applying a large anodic area of sprayed molten aluminum on the surface of the aluminum sheet, the cathodic action of the almost polished surface against the anodic region inside of the fissures could be counteracted. The coating itself, of course, would be attacked in the ordinary manner but without the formation of exfoliations.

The three plates shown above were rolled aluminum sheet, 1.6 mm. thick. They were exposed to a salt spray corrosion test of 90 days duration. One plate was exposed without any protection whatever, one had been sand blasted and one had been sand blasted and sprayed with molten aluminum.[1]

The specimen showing the severest attack is the one that had been sand blasted without any further protection. It shows numerous and extensive exfoliations and a considerable formation of aluminum hydroxide all over

[1] Pessel, Ind. Eng. Chem. 22, 119 (1930).

the surface. The original aluminum sheet (not sand blasted) shows a number of relatively small exfoliations and shallow corrosion areas, although in many places the original luster is still intact. The specimen that had been sprayed with aluminum shows not one exfoliation. The coating itself has been moderately attacked, but offers a very pleasing appearance and is still due for a long life.

While this test seems to indicate a successful prevention of the destructive corrosion exfoliations by the application of sprayed molten aluminum, such a coating should be desirable even in cases where the surface is to be finished with paint, lacquer, etc. A layer of sprayed molten aluminum not only offers an excellent basis for nonmetallic protective coatings, but affords added protection due to its anodic action.

Preventing Leaks in Lead Coated Pails

By WALLACE G. IMHOFF

A SUBSCRIBER sends us the following problem: In lead coating 5-gal. paint pails, we first clean them, then pickle in a muriatic acid solution, then transfer to the flux and dip in a lead bath—95% lead and 5% tin. Temperature of bath is 680 to 700 degrees Fahrenheit. Ware is perfectly airtight before leading but after being coated there are leakers with small blow holes around outside seam.

We have tried keeping the flux heated to a small degreee but this throws off heavy fumes and creates a difficulty in operating.

A.—At first consideration the cause of leaks in lead coating paint pails would seem to be a warpage which is caused by the wide difference in temperatures of the

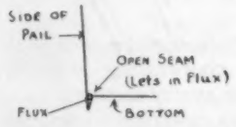


Fig. 1

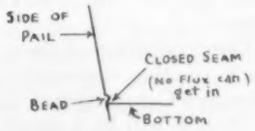


Fig. 2

articles to be coated and the metal bath. A slightly different method of procedure may overcome the trouble since it is stated that the articles are tight around the seams before they are coated.

After cleaning and pickling, wash the articles very thoroughly and then dip them immediately into a saturated solution of zinc chloride. This solution is made by dissolving 9 pounds of zinc ammonium chloride to the gallon of water. The solution must then be kept **clean** and **saturated.** By cleanliness is meant that the pickled articles must not be rusty when they are put into the zinc ammonium chloride dip. The flux dip of zinc ammonium chloride is kept at about 180° F., and the work should be a clean gray color when it comes out of the flux, not a dark green or slightly yellow or brown color. The gray shows the surface to be clean and in good condition; the green, yellow or brown colors are various stages of rusting or corrosion.

After coming out of the flux solution, the articles will be practically the same temperature as the solution, which should be kept between 180° and 200° F. The articles are then placed on a dryer and, since they are hot, they will dry very quickly. While they are fresh they should be put into the bath, as the sooner they are coated the hotter they are and consequently the less strain from difference in temperature.

Lead melts at 327° (621° F.) and it is well to keep the temperature of the bath near 675° to 680° F. The temperature should be high enough, of course, to give sharp, smooth work. The proportion of 5% to 8% of tin in the bath is right, so that the trouble would seem to be in warping rather than with the metal. The change in fluxing procedure should also improve conditions as by the liquid flux method the articles can be heated to from 180° to 200° F. before going into the bath, and this is just enough to eliminate the bad strains due to differences in temperature.

Another suggestion that might be of value is to change the seaming rolls so that the bead will be tight. Leakers usually come when the bead is open, as shown by the sketch in Figure 1. Figure 2 shows how the seam should be made.

Such a change closed up leakers in oil cans which were being galvanized by the hot dip process and it may be necessary in your case with paint pails. The flux gets in the open part of the seam and the gas that is formed holds the metal out. When the article is taken out, the upper part is coated perfectly but down in the seam there are spots where the metal did not get in at all, due to the gas from the flux.

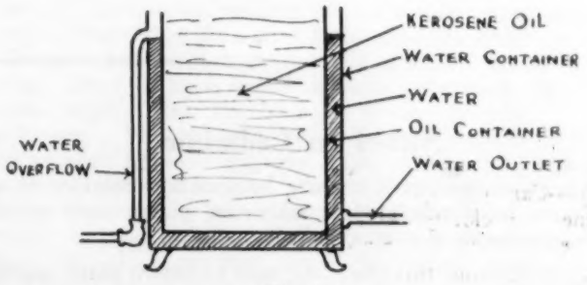


Fig. 3

The zinc ammonium chloride method will help to keep down fumes, in addition to practically eliminating corrosion of the surface while drying. The fine feature of preheating to a small degree is also a decided advantage by this method.

If the small blow holes persist with the liquid flux, try quenching the articles in kerosene oil, which is not so drastic as water. The oil should be placed in a water bath about as in Figure 3.

After quenching, dry in sawdust and clean with compressed air.

Master Samples of Polishing Grain

Group of Polishing Grain Producers Making Progress on Closer Sizing Standards

By J. S. FOLEY

Abrasive Company, Philadelphia, Pa.

ALL concerns having polishing operations in the production of their product will be interested to know master samples of aluminous oxide polishing grain will be available in March, 1931. These samples will help eliminate difficulties encountered in the past of checking sizes by the consumer and producer.

In September, 1930, a committee made up of representatives from the larger artificial grain producers authorized Abrasive Company, Philadelphia, Pa., to produce master samples for checking all grain sizes and particularly the new sizes conforming to General Motors Corporation Specifications as outlined tentatively by N. S. Mosher of Chevrolet Motor Company.

Then too, at this meeting, a Research Fellowship was established at the Bureau of Standards in Washington for the purpose of analyzing problems and eliminating many difficulties encountered in producing these master samples. Mr. Sveshnikoff, assigned to this work, has had considerable experience in various fields of research including sieving practices of various materials. He has Master of Science degrees from the University of Moscow and the Artillery College of Petrograd. Recently he has been employed by the U. S. Navy and the U. S. Bureau of Standards.

His first step, after grain and sieves were supplied, was to determine the source and extent of variations in sieving results, giving primary attention to the sieves. His observations show: (1) that the average sieve openings do not play as significant a part as previous tests made by the producers implied; (2) the difference in wire diameter had little effect on sieving value; (3) and that large openings near the maximum limit were found to play a more important part than any other factor. The "rate of loss" factor was stressed and a method of calibrating sieves developed.

Mr. Sveshnikoff made a careful analysis of all conceivable factors influencing the testing of grain and made suggestions for the improvement of sieving practice. He showed the value of having a standard by which the effectiveness of sieves could be gauged and offered methods of correcting discrepancies which might be present.

The method of test was given a thorough examination and shows the "rate of loss" factor playing an important part because by the scientific use of the "rate of loss" factor, a five minute test and a sixty minute test can be correlated.

It will be vitally necessary to establish a yardstick against which standard the variable factors can be checked. This yardstick will be composed of as nearly perfect sieves as can be obtained and a set of master grain samples which will show 75 to 100% on the control sieve.

The production of these master grain samples will be the work of the Research Associate cooperating with the Abrasive Company and they will be available soon.

Then it will be a simple matter to calibrate sieves; and grain will be produced to a set standard with such a degree of accuracy that problems of securing the proper size now confronting the consuming trade will be largely eliminated.

Nickel on Cadmium

Q.—Can you give us any information relative to a dullness or cloudy surface on nickel plated steel which has been nickeled over a cadmium surface?

In processing this piece, we take cadmium plate, polish and buff, and then nickel plate and polish and buff. The cadmium is bright before the nickel is put on. After these pieces have been exposed to the weather for four or five months they seem to go flat and dull in the same manner as the cadmium would if it had no nickel over it.

A.—We are not in a position to tell you the cause of your trouble as it is the first time that such a problem has come to our attention. We would be inclined to think that the nickel deposit is not of sufficient thickness to prevent oxidation of the cadmium.

We do know that a piece of steel that is copper plated and nickel plated will tarnish if the nickel deposit is not of sufficient thickness, and this may be your trouble. We suggest depositing at least .001 inch of nickel on the cadmium plate before it is nickel polished.

OLIVER J. SIZELOVE.

Cadmium Plate Without Current

Q.—We want directions for deposition of cadmium without the aid of electric current.

Can you give us a method of procedure for this work?

A.—Articles made of either brass or iron may be given a coating of cadmium in the following solution:

Caustic soda	8 oz.
Cadmium Oxide	2 oz.
Aluminum sulphate	4 oz.
Water	1 gallon

Use at boiling temperature. Immerse work for 20 to 30 minutes. Work must be clean, and free from scale.

OLIVER J. SIZELOVE.

The Romance of the Reclamation of Metals

A Radio Address on Secondary Metals, Describing Their Origin, History and Development into a Large Industry

By G. H. CLAMER

President, Ajax Metal Company, Philadelphia, Pa.

BELOW is the text of the radio address delivered over the Columbia Broadcasting System at 7:15 P. M., Eastern Time (6:15 Central Time) Saturday, January 24th, 1931, by the representative of the Non-Ferrous Ingot Metal Institute, G. H. Clamer. Mr. Clamer is President of the Ajax Metal Company, Philadelphia, and is Past President of the American Society for Testing Materials, the American Foundrymen's Association, and others. He spoke from Station WCAU, Philadelphia.

Metals are divided into two major classifications—ferrous and non-ferrous. My talk this evening will be confined to non-ferrous metals. Probably only a small proportion of my hearers have understanding of the term "non-ferrous metals." This is not at all surprising, because the term has been used for a period of less than twenty-five years, to define the products of that enormous industry which produces metals and alloys other than those of the iron group.

The word "ferrous" is derived from "ferrum", the chemical name for iron. Ferrous, therefore, means "pertaining to iron," and hence non-ferrous designates all metals or alloys other than iron. The term, however, is used in a broader sense, in that it includes all the metals of the group which in chemistry is known as "the iron group." The metals of the iron group are the following: nickel, chromium, manganese and cobalt.

A non-ferrous metal, therefore, is any metal other than a metal of the iron group. A non-ferrous alloy is an alloy in which the predominating constituent is a metal which does not belong to the iron group.

The most commonly known and used metals coming under the classification of non-ferrous are copper, tin, lead, zinc and aluminum. The term embraces also the precious metals, viz., gold, silver, platinum, etc., but these will not be included in my talk tonight.

The value of the output of the four following non-ferrous metals in the United States during the year 1929 was the following:

Copper	$362,500,000
Zinc	90,000,000
Lead	94,000,000
Aluminum	54,000,000
Total	$600,500,000

Tin is produced in the United States only in insignificant amounts. We are, therefore, large importers of that material, the imports in 1929 being 89,502 tons.

These figures are given merely for the purpose of conveying some idea of the yearly return to the scrap pile. Practically all metal reaches the scrap pile in due course; some of it after a short but useful service and some after many generations. Some well-preserved copper objects are now in our museums that were produced over 6000 years ago. These will, no doubt, remain there for further countless ages. The oldest known objects of brass date back to 1004 B. C. Brass was made by the ancient calamine process before zinc, the chief alloying constituent of copper, had been isolated in its metallic form. Tin and lead were also known to the ancients, but zinc in its elemental form was not isolated until about 1500 A. D.

Sources of Scrap Metals

Now, let us trace the sources of scrap metals. These can be roughly divided into two classes—first, those resulting from fabrication, and, second, those resulting from discarded useful or ornamental structures. Under the former classification there is first the metal lost in the melting operation. Metal in contact with the atmosphere of sulphur containing products of combustion will form oxides and sulphides, producing what is commonly known as dross. Then, also, there is loss due to spattering during the casting operation. These products are recoverable. Second, if the metal is cast into some form requiring finishing operation, scrap results in the production of finely divided metal in the form of filings, sawings, turnings or borings, grindings or polishing dust, depending on the finishing operation or operations resorted to. Third, if the metal in some wrought form, as for example, sheet, rod, tube, wire, etc., is fabricated into finished form, scrap results due to cutting, stamping, etc.

All scrap resulting from fabricating processes is returned for refining and re-use in a comparatively short time after the initial melting of the metal. Frequently, scrap is returned to the source from which the metal comes.

When a metal object is placed in useful or ornamental service, the time lapse before it reaches the scrap pile depends largely upon the class of service to which it is consigned. The greatest consumption of copper is for copper wire for electrical use. The average life in such service is perhaps twenty years. Non-ferrous metal is extensively used in automobile construction, the average weight of non-ferrous metals per automobile being 93 lbs. In this country alone we now have over 26,000,000 automobiles. The life of the average car is seven years. This means that approximately 4,000,000 cars per year are scrapped, from which are derived 345,000,000 lbs. of non-ferrous scrap metal yearly. Non-ferrous metal is used in the radio set which makes possible the hearing of my voice at this moment. Each set contains but a few pounds of non-ferrous metal, but in the aggregate the tonnage is enormous. The life of a radio set is perhaps less than five years. This is especially true for the immediate period, which is one of rapid development in the art. Every railway car, with the exception of the few now equipped with roller bearings, carries on an average 200 lbs. of non-ferrous metal. Each locomotive carries at least half a ton of non-ferrous metals. These figures, multiplied by the great number of cars and loco-

motives in service, again amounts to vast potential sources of supply of non-ferrous scrap metals. Such scrap metal occurs in many forms; a recent classification list contains 126 items.

Scrap metals are collected through innumerable channels. The collection of miscellaneous scrap starts with the small peddler or the small junk dealer. The small collector sells to a larger dealer. This larger dealer buys in small lots from such small collectors and accumulates until he has sufficient to be of interest to the large user. Small lot buying is also resorted to by the small user. In the commercial end of this business a paradoxical condition exists, in that it is always possible to buy small lots at more favorable prices than larger ones. The buyer usually fixes the selling price. The question involved in the transaction is not "How much?" but "What will you pay?" In more recent years bargaining except within a small price range is disappearing, because dealers' buying prices and dealers' selling prices of the principal scrap classifications are quoted in the daily trade papers and are in fair accord with the market.

Conversion Into Usable Forms

Having briefly reviewed the sources of non-ferrous scrap metal, I will now tell you how such material is converted into useful form. Scrap may be segregated into classes having fairly definitely known chemical composition. For example, it is possible to segregate so-called "No. 1 Copper." This may be used in place of virgin ingot copper or it may be returned to the copper refinery where it is, after being subjected to proper metallurgical treatment, cast into one of the forms in which all so-called "virgin copper" is marketed, namely, slabs for sheet making, or ingots for re-melting. Much scrap lead is put back into pig form by simply melting and giving it a slight refining treatment. So also are zinc and aluminum brought back into useful form.

Some of the alloys, especially yellow brass, are often returned in such uncontaminated condition as to require only re-melting to put back into some useful form. Although there is a tremendous tonnage of scrap that is clearly identifiable and that can be used over with a firm knowledge of its chemical composition, there still remains that vast tonnage that can be sorted only to approximate chemical composition as reflected by color and nature of the particular pieces. Color is the main guide in sorting —it is yellow, it is red, or it is in between. If it is yellow, it is known in the trade as "yellow brass." Yellow brass contains roughly from 60 to 75% of copper; the balance is very largely zinc. Red brass contains from 75 to over 90% or copper, balance being tin, lead and zinc. The in between grades are classified either as poor red or rich yellow, depending on the predominating color.

Special bronzes and brasses have their characteristic colors, recognizable to the experienced sorter, especially if a section of the original skin of its casting remains. Iron is easily detected by bringing the piece in a magnetic field. Detached pieces of iron are withdrawn from non-ferrous scrap by this means. Often, attached pieces are present, and these may be detected by applying a small hand magnet and feeling the magnetic pull. Small internal pieces attached to a large casting, unfortunately, cannot be so detected. Aluminum and aluminum alloys frequently accompany copper alloy scrap. These are easily detected by white color and removed. Other metals and alloys that are detectable by color may also be removed. To sort brass scrap properly the sorter must be experienced. Foundrymen have learned by experience that only a small proportion of the sorted brass is suitable for direct melting and pouring into castings. The variation in the constituents of the alloy resulting from the mere melting of a miscellaneous lot of scrap is too wide to meet commercial requirements; also, the content of undesirable elements is usually too high.

The service performed by the producer of copper base alloys (usually in the trade referred to as non-ferrous ingots) is to take such heterogeneous scrap and through a process of melting and refining conducted in large, open-hearth type furnaces, produce thereby alloys to specifications defining definite percentage tolerances on the main constituents and upper limits on the impurities, which may not be exceeded. The art of ingot making has advanced to such degree that today the consumer can buy from concerns who are properly equipped and technically manned, copper base alloy ingots with practically the same confidence with which he buys electrolytic copper. This industry has grown during twenty-five years from which, in the early stages, produced but a small tonnage of uncertain and indeterminable quality, to one which has today assumed a permanent place in industry. The economic reason for the existence of the non-ferrous ingot industry is primarily the fact that a saving is effected by the use of ingot as compared with using virgin metals. Furthermore, with present-day refining, scrap metals are converted into alloys that are satisfactory in every respect, resulting in the production of castings both lower in first and end cost, than if virgin metals were used, and in end cost if produced directly from scrap.

The combined output of the industry last year was approximately 200,000,000 pounds, having an approximate value of $24,000,000.

The reclaimed non-ferrous scrap, in the form of non-ferrous ingots, is re-melted in brass foundries and finds its use in the following: automotive parts, parts of machine construction, railroad equipment, ships, plumbers' fittings, valves, ornamental structures and objects of all kinds. The scrap from the castings produced from this recovered metal in due course again reaches the scrap pile, once more to go through the reclaiming and refining operation, to become again useful in form.

Organization of the Industry

Recently, producers of non-ferrous ingot in this country organized an institute, known as the Non-Ferrous Ingot Metal Institute. Through co-operative effort of the members of this Institute with the American Society for Testing Materials and other technical bodies, definite progress has been made toward standardization of the alloys in use. As a result of a survey made, it was found that over 600 so-called common alloys were in use, and in addition thereto, many special alloys that are usually classed as high strength alloys. Tentative specifications have been promulgated and approved by the American Society for Testing Materials covering 15 alloys. It is believed that these, to a very large degree, may be used in place of the more than 600 now in use. Steps along educational lines will be necessary in order to make this work useful and effective. It is, of course, not believed that the industry will in five years or ten years from now be producing only 15 alloys, but at least a goal has been set and constructive efforts should be made to approach it as closely as is possible. The Institute has also been instrumental bringing about cooperative arrangements with the Bureau of Standards whereby technical researches are now being conducted at the Bureau for the purpose of providing additional and better information regarding copper base casting alloys than is at present available.

The non-ferrous ingot industry, although it may be classed as one of America's infant industries, has had a remarkably sturdy growth, as is manifested by the figures I have given. The total value of reclaimed non-ferrous metals, including copper base alloy ingots, for 1929 was $300,000,000; figures for 1930 are not yet available.

THE METAL INDUSTRY

With Which Are Incorporated
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Edition this Month, 6,000 Copies. Buyers Guide, Advertising Page 71.

Editorial

Better Times.

There is one very important change which has come over American business and industry. We are no longer talking about hard times to come. We are not talking about the hard times which have passed. We are even talking less about hard times of the present. We are concentrating, as never before, our attention and our efforts upon the better times coming.

Again and again we see in the daily press statements from business leaders expressing a conviction that improvement is due. Some of them are bold enough to state that the worst is over and that we are now beginning to ascend the upgrade. The more volatile and enthusiastic predict a rise in the near future. The more careful and conservative refrain from specifying the time. But all seem to be agreed that the trough of the depression has been reached and that the worst is over. There is no boyish enthusiasm. There are no prophecies of high times in the next year. There are sober plans for conserving assets, careful consideration of entering upon new projects of preserving employment as much as possible to carry on buying power and of holding fast whatever gains have been made. The government is doing its part. According to Colonel Woods, public works totalling about $2,500,000 are in progress as the result of the concerted drive in all parts of the country to make use of surplus labor.

The automobile industry convicted many times in past years of being over-optimistic, expects to sell about 4,000,000 cars in the next year. This is only 500,000 more than the record for 1930 which was so low as to make the prediction for 1931 seem conservative, only 15 per cent above one of the worst years in its recent history.

But even this improvement will be widely felt, especially in the metal industries, as the automobiles consume such large proportions of our metals: 26 per cent of the nickel; 31 per cent of the lead; 15 per cent of the copper; 23 per cent of the tin and so on right through the list.

According to the Architectural Forum an increase of about 8 per cent is expected in building construction, another major outlet for metals.

The present volume of production is low but very much lower than the present volume of sales. Public buying has decreased, as far as can be estimated, from the latest statistics of retail sales, not more than 10 per cent, while production is very nearly at 50 per cent capacity. Inquiries are more numerous and in better volume than ever and orders are sure to follow, to catch up with consumption.

Business may be down but it is not out; and what is much more to the point, it is coming back.

Stabilization of Employment

American industry is beginning to recognize as never before, its responsibility in developing plans for maintaining employment. Public conscience has been awakened to the fact that employment is not only the concern of the individual but of the people as a whole. Both from the standpoint of humanity and common sense, the principle that employment should be regular and not intermittent commends itself to the approval of everyone. No one can live decently, perform his work properly and maintain his place as a good citizen as long as he is obsessed by the fear of losing his job.

For the first time we have the national government taking an active hand in relieving the effects of unemployment brought about by the depression. Business organizations and associations are asking themselves what they can do to hold their help. It is unfortunate that a considerable part of the relief work going on is in the form of charity or plans which closely resemble charity, which is always embarrassing to the receiver and embarrassing to the giver. It is far from the ideal method of caring for such emergencies. We can only plead that we have no other way at this time.

There are two important steps to be taken. The first is to tide over the present trouble and to alleviate suffering so far as possible. The second is, when we are out of the depths, to organize carefully and systematically against the problem as a whole. Unemployment is an international evil. It cannot be cured by charity. Some say that it cannot be completely cured by anything. But certainly we are awake as never before to the need for attempting its cure along rational, systematic, orderly lines.

Perhaps it will call for a permanent organization. Perhaps the cost of such a project when written down in cold figures may seem large. But it is certain that any expense involved would be a tiny fraction of the losses caused to business by the reduced purchasing power of a considerable part of our working population.

Depression or no depression, we must never again be without some protection against the ruinous effects of unemployment.

The Romance of Secondary Metals

Scrap metals are the last things usually thought of as romantic but we are informed by no less an authority than G. H. Clamer, in a radio talk reprinted on page 75 of this issue, that there is romance in scrap metals and we cannot help agreeing with him. Coming as they do from every conceivable nook and cranny in the house, the farm and the workshop, scrap metals flow in a vast number of small quantity lots toward local centers from which, in larger lots, they go to larger centers, and finally in huge shipments to smelters and refiners, who in turn ship to manufacturers who redistribute these metals in their products to the consuming public. As a result, we have the figure that the total value of reclaimed ingots for the year 1929 was $300,000,000. The producers of secondary copper base alloy ingots alone turned out about 200,000,000 pounds in 1930 with a value of about $24,000,000.

The romance lies not only in the huge quantities involved. It lies in the energy and industry applied by those engaged in collecting scrap; in the ingenuity and care exercised by those who sort and refine it, eliminating undesirable constituents, separating the different valuable products from pure metals and even taking the lowest form of waste, dross, and recovering from it good grades of alloys.

The secondary metal trade is a hard one, physically and mentally. It calls for the best efforts of those engaged in it. But there is no more worthy field of endeavor than the reclamation of useful materials from what would otherwise be lost. The romance is there for those who have eyes to see it. Virtue is also there by the prevention of waste. We wish that profit, commensurate with the effort and risk involved, were also there.

A Hope for Silver

Silver is still leading a troubled life. Demonatized in its former strongholds, it continues to be produced in larger quantities than industry and the arts can absorb it. The reason for this continued overproduction is that it occupies the unique position of being produced, more than 50 per cent, from ores valued chiefly for other metals. It is largely a by-product now where once it was the mainstay of a considerable part of the mining industry. According to Economic Paper No. 10 from the Bureau of Mines, Washington, D. C., written by C. W. Merrill, over half of the world's production of silver is from ores that derive less than 40 per cent of their recoverable value from silver; almost one-third is from ores carrying not more than 20 per cent of their value in the form of silver.

A new plan has been suggested for improving its price. We are to lend to China a billion ounces to be repaid in fifty years at a very low rate of interest, about 2 per cent. This will improve employment in China and at the same time create markets for products of other nations.

Whether this scheme is economically sound or not depends upon the effect of placing such a huge quantity of American silver on the market when this silver is at the present moment impounded or held back from sale. Would such a move depress the price of silver still further, or has the long drop been the result, to some extent, of the existence of our large stocks of silver?

Like all questions of economies, which is still far from a science, there is considerable disagreement on this point. There is no doubt, however, that any move which would ameliorate the present disorder and misery in China, givin that nation a chance to go to work instead of fighting, would at the same time provide an appreciable market for the products of other nations and be a boon to all sides.

A Metal Finishers' Society

It seems that the metal coating industry is divided into two parts—metal covering and metal finishing. The covering may be done by electroplating, dipping in solution or molten metal, spraying, sherardizing, etc. The finishing may be done by polishing, buffing, coloring and so on. It was this division of operations that A. P. Munning mentioned in his letter, published in our January issue of this year (page 30), in which he recommended the formation of a Finishing Engineers' Society to specialize on the surfacing of metals before and after plating. In this issue we print a letter from Joseph H. Hansjosten, one of the pioneers of the American Electroplaters' Society, strongly approving of this suggestion.

It has been stated that polishing is now where grinding was thirty years ago. We know that polishing machines have improved; but have polishing methods kept up with the times? Mechanically there have been important advances but in materials there has been small change even though the methods of making buffs have improved in the last few years. The metal finishing industry is faced with the need for polishing stainless steel of the nickel-chromium type, a very difficult problem. It also has chromium plate to contend with but this, hard as it is, seems to be giving way before the efforts of the polishers.

At the present time there is no way of differentiating between a good and bad polish except by the eye, and as everyone knows, the unaided eye is a great deceiver. Perhaps an early step should be the development of proper testing methods for polishes. One way to get comparisons may be through the light reflecting power of the polished material.

These are, of course, only conjectures. The important thing is that the art of metal finishing should be organized and raised to the plane of a science. This is not an easy task but the question of difficulty has never deterred American industry. We have the growth and development of the American Electroplaters' Society as a shining example.

Correspondence and Discussion

A Finishing Engineers' Society

To the Editor of THE METAL INDUSTRY:

Mr. A. P. Munning's letter in the January issue of THE METAL INDUSTRY is a classic in the literature of the plating industry. Every line of it bespeaks the striking personality of its author, and his words add weight to every subject he touches in his splendid article.

His suggestion that a Finishing Engineers' Society similar to the American Electroplaters' Society be formed is worthy of the best thought of every one in the plating industry, and it is this writer's hope that others may think likewise. That there is need for such a society cannot be questioned. That such a society would do much good for the industry is likewise an indisputable fact.

It may also be assumed that many men in the industry would welcome the formation of such a society and are ready to co-operate in forming one. There is no doubt that many heads of polishing and plating departments would like to discuss their finishing problems with men in similar positions in other plants and, by exchanging ideas, improve their methods.

The coming of chromium plating demonstrated the importance of the operations prior to plating and proved the necessity of doing them well, as well in their way as the plating itself; and we found we had not attained perfection in polishing and buffing.

In a recent address to the members of Detroit Branch of the American Electroplaters' Society, Robert T. Kent stated that "polishing is now where grinding was thirty years ago." And he stated a fact, for, while we may have improved methods to some extent, we are still doing work in the same old way, the way we learned to do it and without adding any radical improvement. True, the polishing and buffing machine is more extensively used and its use will, no doubt, increase more in the next few years than it has in the past twenty or thirty, but it must be borne in mind that with machine polishing (in my opinion, erroneously called automatic polishing), the human element is the greatest factor involved, and where the human factor predominates, education is a necessity.

A Finishing Engineers' Society is needed to bring together men interested in this phase of the plating industry, so that finishing may be put on a scientific plane, as plating has been placed on a scientific basis by the American Electroplaters' Society.

Mr. Munning, in his letter, mentions stainless steel and says he "has observed no novel way to handle this particular problem." Many of us are facing that problem today, and many more will face it in the near future, for who can foretell the extent of its use? It behooves us to study methods of finishing it. What a great aid a society would be in solving just that one problem!

Let us note the reaction to Mr. Munning's suggestion. This writer hopes it will be favorable, and he will cheerfully give of his limited knowledge and humble efforts to promote its success.

JOSEPH H. HANSJOSTEN.

Detroit, Mich., January, 1931.

Lead Sulphide Mirrors

To the Editor of THE METAL INDUSTRY:

I happened to see in the November issue of your magazine, on page 532, the query relating to sulphide mirrors.

I note in the reply by Mr. Walter Fraine that he is not familiar with mirrors prepared in this way. You may of course now have obtained further information, but in case it may be of interest to you I am sending herewith copy of our "Dutch Boy Quarterly," on page 21 of which there is a short description of "The Lead Deposit Mirror."

There is a United States patent for lead sulphide mirrors, an abstract of which is given as follows:

Lead Sulphide Mirrors

Solution 1		Solution 2	
Lead acetate	1 oz.	NaOH or other alkali agent	2 oz.
Water	24 oz.	Water	32 oz.

Solution 3	
Thio urea	1 oz.
Water	48 oz.

After preparation of the different solutions, the surface of the glass to be coated is washed and placed flatwise in a horizontal plane. The glass may have either atmospheric temperature or be heated somewhat to 95° F.

Solutions 1 and 3 are then mixed in the proportions of 4 parts of Solution 3 to one part of Solution 1. Thereafter Solution No. 2 is added to the mix to the extent of one part Solution 2 and 5 parts of combined Solutions 1 and 3.

The complete mixture is then poured upon the glass and the chemical action between the ingredients or Solutions 1 and 2 immediately begins. Within about 10 or 15 minutes, the lead precipitates have been deposited on the glass. Thereupon, the surplus or undeposited materials are removed and the precipitated materials permitted to dry, after which a coating of shellac and a dark pigment backing is applied. If lead is employed as the metallic element, it is not necessary to apply a pigment except as a protective coating.

The sulphur which is present in the thio urea combines with the lead and forms lead sulphide which adheres to the glass, and this sulphide constitutes the reflecting surface.

See U. S. Patent No. 1,603,936 "Mirror and Coating for the same," by George F. Colbert and William H. Colbert, Pittsburgh.

With best wishes,

WILLIAM A. COWAN,
National Lead Company Research Laboratories.

Brooklyn, N. Y.
January, 1931.

Lacquer Prices and Quality

To the Editor of THE METAL INDUSTRY:

Your article regarding lacquer in the January issue is very much to the point. As lacquer manufacturers, we are grateful and from the writer's point of view as a salesman, nothing could be added to make it more impressive.

However, since as you state that there must be a standard adopted, we are taking the liberty of making some suggestions regarding a standard.

It is an old inviolable law that a manufacturer in order to stay in business must make profits, legitimate—of course. Prices usually indicate quality; a low-priced product is usually a cheap product. The conclusion is that a manufacturer who sells cheap materials is not selling quality materials.

As far as we know, a fair grade of lacquer cannot be sold under three dollars ($3.00) per gallon (in barrels) or a thinner for same at less than two dollars ($2.00) per gallon in the same quantities. Please bear in mind that I said a fair grade. The above prices are by no means on real high-grade materials.

We are wondering whether the lacquer industry cannot find a "Moses" to lead it out of the "Price-Cutting Desert" and place it in the "Promised Land" where it was several years ago.

As manufacturers, we shall comply with any suggestions that you may offer in order to remedy conditions described in your worthy article.

A REPUTABLE LACQUER MANUFACTURER.

January, 1931.

New Books

Secondary Aluminum, by Robert J. Anderson. Published by the Sherwood Press. Size 6 x 9, 550 pages. Price $10.00. This is the first book on the production of secondary aluminum from scrap. Written as it is by an authority on aluminum and one who has had considerable practical experience in this field, it should be an important contribution to the secondary aluminum industry. It is a reference book for works managers, metallurgists, chemists, scrap dealers, smelters, foundrymen and engineers who deal with aluminum.

A series of articles by Dr. Anderson on this subject has been running for some time in THE METAL INDUSTRY, the data of which is collected in his book. Among the subjects covered are the following: Kinds and Sources of Scrap; Contamination of Scrap; Scrap Sorting and Grading; Buying and Selling Aluminum Scrap; Sampling, Assaying and Evaluation; Oxidation and Its Prevention; Fluxes in Scrap Melting; Preliminary Treatment of Scrap; Furnaces in Secondary Melting; Remelting Practice and Blending; Metal Recoveries in Melting Scrap; Refining of Secondary Aluminum; Aluminum Alloys and Alloying Practice; Accessory Equipment and Tools; Recovery and Disposal of By-Products; Costs of Production; Quality and Use of Secondary Aluminum; Technical Control in Secondary Practice; Economic Aspects of the Industry.

Metallurgists' and Chemists' Handbook. Third edition. Published by the McGraw-Hill Book Company, New York. Size 4 x 7, 847 pages. Price $5.00.

This handbook is a reference work of tables and data for the metallurgist who is particularly interested in the recovery of metals from ores. It includes, however, a considerable amount of fundamental information such as physical constants, chemical data, fuels and refractors, mechanical engineering and construction, general metallurgy and organic chemistry. Written, as it is, with an eye also to the traveler in the wilds, it includes a chapter on first aid.

In the section under general metallurgy is given a list of alloys and their properties, necessarily condensed because it must devote small space to a large subject. The author has a difficult job in hand but has succeeded in making his book very useful to metallurgists in general.

Book of Standards of the American Society for Testing Materials for 1930. Part 1, Metals. Published by the Society for Testing Materials. Size 6 x 9, 1000 pages. Price $7.50 to $9.00, depending upon the binding.

This triennial publication of the American Society for Testing Materials, needs no introduction or praise, as it has long been an indispensable reference book in every metallurgical library, and also to those who buy and sell metallurgical products. In this volume are included 66 standards relating to nonferrous metals, 8 standards for zinc coated articles, 2 standard methods of determining the weight of coating on zinc, tin and lead coated sheets, a standard method of testing zinc coated iron and steel wire and a number of standards for metallographic and other kinds of testing methods.

Condensed Chemical Dictionary. Published by the Chemical Catalog Company, New York. Size 6 x 9, 551 pages. Price $10.00.

The Condensed Chemical Dictionary, now in its second edition, is a well-known reference volume for data concerning chemicals and other substances used in manufacturing and laboratory work. It gives, in alphabetical order, the names of chemical substances, the formulae and numerous properties, such as color, odor, inflammability, physical constants, solubilities, derivation methods of purification, various grades, shipping containers and uses. The chemicals are cross-indexed so that they may be found under their various names. The book is a very important part of every chemical library.

Impurities in Metals. By C. J. Smithells. Second edition. Published by John Wiley and Sons, Inc., New York. Size 6 x 9½, 190 pages. Price $5.00. This book is a discussion of the metallography of the common metals containing added elements in small amounts. These added elements may be classed as "impurities" or they may have been intentionally added, making them "minor constituents." Several chapters of the first edition have been expanded and additional information has been included on the effective gases in metals, and impurities on the mechanical properties of metals. The book is concise and contains much data on metallography.

Journal of the British Institute of Metals. Published by the Institute of Metals, 36 Victoria Street, London, S.W. 1, England. Size 5½ x 8, 841 pages. Price 31s. 6d. This is volume 43 of the Journal of the British Institute of Metals, consisting of a record of the proceedings of the recent meetings and also of abstracts of the world's metallurgical literature. The volume is complete, with a name and subject index. It contains in full the papers and the discussions given at the recent meetings which have been published in abstract in reports of these meetings in THE METAL INDUSTRY.

Standards Year Book for 1930. Published by the National Bureau of Standards, Washington, D. C. Price 75 cents. This annual publication is particularly interesting to those engaged in standardization. It is a concise summary giving brief resumes of the progress made by government agencies, the activities of American technical societies and trade organizations, and the national standards associations throughout the world; in short, a standardization reference book. It is obtainable directly from the Superintendent of Documents, Washington, D. C.

Chemical Synonyms and Trade Names. By William Gardner. Published by the Industrial Book Company, New York. Size 6 x 9½, 355 pages. Price $9.00.

This is a dictionary and commercial handbook of chemicals for importers, manufacturers, dealers, purchasing agents, etc., of chemicals including pharmaceuticals, dye stuffs, minerals, explosives, pigments and alloys. It contains nearly 20,000 definitions and cross-references under both chemical and trade names. The book is now in its third edition, revised and considerably enlarged.

The New Tinsmith's Helper and Pattern Book. By Hall V. Williams. Fifth edition. Published by the U. P. C. Book Company, New York. Size 4½ x 6½, 458 pages. Price $3.00.

This is a text book and working guide for the apprentice, student or mechanic, giving practical applications of the problems in the cutting of conical vessels, elbows and piping, furnace fittings, ducts, gutters, leaders and roofing tinclad fireproof doors, cornices and skylight work. It includes also many tables, shop kinks, recipes and formulas.

Engineering Metallurgy. By Stoughton and Butts. Published by McGraw-Hill Book Company, New York. Size 6 x 9, 498 pages. Price $4.00. Engineering Metallurgy is one of a series of metallurgical text books, now in its second edition. Its purpose is to give engineers a thorough grounding in the knowledge of metals, covering the chemical or extractive side of metallurgy, alloys, heat treatment, welding, testing, etc.

Techno-Dictionary. Published by Hubert Hermanns, Berlin-Lichterfelde (West), Dahlemer Strasse 64 A. Size 4 x 6, 411 pages. Price $3.75. This is a technical dictionary in German, English and Italian, in its second edition, revised and enlarged to aid the engineer and business man in keeping in touch with foreign literature. It is a collection of technical terms from metallurgical, foundry, factory and work shop practice.

Punches, Dies and Tools for Manufacturing in Presses. By Price $2.25. The purpose of this book is to demonstrate the advantages of a direct reading table over the ordinary kind that requires an extra calculation to interpolate for most of the values taken from it. The book contains ten complete tables, none of which require calculation of any kind.

Five Years of Research in Industry. Compiled by C. J. West for the National Research Council, 29 W. 39th Street, New York. Size 6 x 9, 91 pages. Price 50 cents. A reading list of selected articles from the technical press presenting a cross section of important industrial research activities.

Shop Problems

This Department Will Answer Questions Relating to Shop Practice.

Aluminum Casting Alloy

Q.—We are regular subscribers to your publication and in accordance with your invitation to submit problems in the matter of foundry casting we will be pleased to have you favor us with information on the following subject.

On certain aluminum castings which we produce it is our purpose to furnish them from material which will be as free from corrosion as possible, and also from the usual discoloration. In endeavoring to adopt a 95-5 aluminum-silicon alloy we have been confronted by some difficulty as some of the castings are subject to wear and should be harder than others.

We would like to know of a hardener which could be used in this connection which would not detract from the non-corrosive qualities of this particular grade of aluminum and at the same time avoid discoloration as much as possible. We have tried a hardener containing a small percentage of nickel but found that it would not give us the desired result, and we are rather hesitant about increasing the addition of nickel over that suggested as it may lead to other problems in the way of proper melting or machining. We have also tried a boron product known as a copper-zinc hardener, but after having some of the castings analyzed we were told that this material affects the original qualities of the alloy, as in addition to the two metals named the analysis also showed a trace of iron.

A.—There are two alloys that may suit your requirements. We would suggest:

No. 1—Silicon	8%
Copper	6%
Aluminum	86%
No. 2—Copper	3½%
Nickel	4½%
Silicon	2½%
Aluminum	Remainder

The No. 2 alloy takes a bright permanent polish and is much harder than 95 aluminum, and 5 silicon, and can be purchased from the makers of alloy aluminum in ingot form.

No. 1 is easily made and handled, and should be satisfactory for your requirements. It is somewhat harder and will resist corrosion. W. J. R., Problem 4,056.

Aluminum Pressure Castings

Q.—We are having trouble in getting an aluminum casting that will hold water under pressure, and are wondering what alloy can be used with the aluminum that would make our castings water tight. We are enclosing a circular showing the casting, the walls of which are 13/64" thick.

A.—We suggest that you use a mixture of 12% copper, 1% silicon, remainder aluminum. Melt as follows:

Secure a hardener of 50% copper and 50% aluminum, and a hardener of 40% aluminum, 40% copper and 20% silicon. This material can be had from most aluminum smelters if you do not care to make it yourself.

Then melt 75% aluminum, 99.99% pure. When melted, add 5% of the silicon hardener, and then add 20% of the copper hardener. Stir well and flux with chloride of zinc.

We believe this mixture will take care of your difficulty. This mixture is used very successfully for aluminum castings that are subject to water pressure. W. J. R., Problem 4,057.

"Birmingham Brass" Finish

Q.—I would like to know if there is a finish known as "Birmingham Brass." We have some lamps to be finished as such and have only a description of finish. It is supposed to be a smutty yellow and green. If you could give any solution for making finish I would be very grateful to you.

A.—We do not know of any specific finish such as "Birmingham Brass." Any given finish may be found on the market under different names. A sample of what you wish to reproduce would probably enable us to help you more definitely.

We suggest that you try out the following formulas, which will give a wide variety of greens if the proportions of the formulas are varied:

Hyposulphite soda	8 oz.
Either acetate lead, nickel sulphate, nitrate of iron, or perchloride of iron	2 to 6 oz.
Water	1 gal.

Used by hot immersion.

Bisulphite of soda	4 oz.
Acetate lead	1½ oz.
Water	1 gal.

Use hot and dip work in repeatedly to get various colors.

Sulphate of copper	2 oz.
Sulphate of iron	2 oz.
Carbonate ammonia	2 oz.
Water	1 gal.

The depressions or high-lights may be touched up with colors to give relief to a design. The work should be lacquered to hold colors and give wear. W. F., Problem 4,058.

Chromium on Syphon Tops

Q.—We are trying to put a chromium plate on the tops for seltzer syphons, such as the sample we are sending you. Will you kindly suggest the proper procedure for this work?

A.—The following procedure is recommended for the plating of zinc die castings such as your sample:

After the work is properly polished, it is washed in gasoline, and then colored on a loose-leaf buff wheel, using as little lime composition as possible in the coloring operation.

The work is then racked or wired and cleaned in a solution made of trisodium phosphate 2 ounces, carbonate soda 2 ounces, water 1 gallon. Use hot. Rinse in water and pickle in a muriatic acid dip made of muriatic acid 1 pint, water 1 gallon. Rinse and either flash in brass solution or plate directly in the following nickel solution:

Double nickel salts	10 oz.
Sodium chloride	7 oz.
Boric acid	2 oz.
Sodium sulphate	4 oz.
Sodium citrate	1 oz.
Water	1 gal.

Operate solution at a pH of 6.8; temperature 80° F.; strike at 3½ to 4 volts for a few seconds; then reduce voltage to 2½.

After the work is nickel plated for 10 to 12 minutes, it is nickel colored and then chromium plated.

O. J S., Problem 4,059.

Copper and Nickel Analyses

Q.—We are sending samples of our copper and nickel solutions. Will you kindly analyze these and tell us what additions they require to put them in shape for operation?

A.—Analysis of nickel solution:

Metallic nickel	2.55 oz.
Chlorides	3.47 oz.
pH	5.2

The pH of this solution is too low. Add 9 ounces of 26 degree ammonia to each 100 gallons of solution.

Analysis of cyanide copper solution:

Metallic copper	5.09 oz.
Free cyanide	.11 oz.

The free cyanide content of this solution is too low. Add 1 ounce of sodium cyanide to each gallon of solution.

O. J. S., Problem 4,060.

Etched Name Plates

Q.—I have taken up the manufacturing of etched brass signs, but I am having trouble getting the black background.

Inclosed I send you a sample with a deep black which I want to produce. I am etching with perchloride of iron, or with the electric current in a solution of blue stone. After etching I wash it, give it a coating of copper, and then put it in a black nickel solution with low current. I am using the black nickel salt No. 3 in the book by Bedell.

My outfit is brand new and supplied by a large company. My trouble is that the black comes out in a deep gray which I cannot use. On the polished and buffed brass I am getting a wonderful deep black, but not on the etched surface. I have tried an oxidize on the copper plated ground, but it peels off. Liver of sulphur does not work.

I don't think that the spray gun has been used on the sample, an oxidizing dip must have been used.

A.—The method you use for etching is a very satisfactory and reliable one. Instead of copper plating after etching, the plates should be dipped quickly in a bright acid dip, rinsed in water, and, if the background does not clear up, repeat the operation. The bright dip to be made as follows:

Sulphuric acid	3 gal.
Nitric acid or aqua fortis	1 gal.
Muriatic acid	2 oz.

Use the dip cold and rinse off as rapidly as possible. Transfer to a black nickel solution as follows:

Single sulphate nickel	8 oz.
Sulphocyanide of sodium	2 oz.
Sulphate zinc	2 oz.
Chloride of nickel	3 oz.
Water	1 gal.

Use nickel anodes; voltage ½ to 1. If at any time the deposit is of a gray color, reduce the voltage or add ½ ounce of sulphate of zinc per gallon.

The name plates should be given a coat of lacquer to protect the finish.

W. F., Problem 4,061.

Nickel Analysis

Q.—We are sending a sample of a nickel solution for analysis and recommendations.

A.—Analysis of nickel solution:

Metallic nickel	2.19 oz.
Chlorides	3.69 oz.
pH	6.4

Analysis shows that the pH of the solution is quite high. Would suggest that you reduce the pH somewhat by adding 3 fluid ounces of c.p. sulfuric acid to each 100 gallons of solution. Had you stated the character of your trouble, we would have been in a position to advise you more fully.

O. J. S., Problem 4,062.

Re-Bluing Pistols

Q.—We are interested to learn how to re-blue pistols, as we have many calls for such work. Any information you may give us on this subject will be greatly appreciated.

A.—Either of the following methods may be used to produce a blue or blue-black finish on such work. Whichever method is used, the work should be polished to a high finish and cleaned thoroughly first.

The first method consists of placing the work in a molten sodium nitrate bath. Place the sodium nitrate in a cast iron pot or trough and heat until the sodium nitrate is melted. This requires a temperature of 700° to 800° F. After the work remains in this bath for two or three minutes, it is allowed to cool somewhat, washed in hot water, dried, and then oiled with paraffine or linseed oil.

The second method is to place the work in the following bronzing solution:

Copper sulphate	½ oz.
Chloride of iron	1 lb.
Muriatic acid	4 oz.
Nitric acid	½ oz.
Water	1 gal.

After the work has remained in this solution for fifteen minutes, it is allowed to dry for several hours. Then place in the solution again for 15 minutes, and then allow to dry for ten hours. They are then placed in boiling water for one-half hour, dried, and scratch-brushed lightly on a fine steel wire wheel which will produce a good blue-black finish. Finally, oil with linseed or paraffine oil, and then wipe dry with a clean rag.

O. J. S., Problem 4,063.

Red on Yellow Brass

Q.—Can you give me any information on a dip that will give a yellow brass casting the appearance of red brass?

Our castings are composed of copper 72-74, tin 1½, lead 4, zinc 22. I can produce a red on these castings, but it has too much of a coppery look; besides, it is too slow for production.

A.—We do not know of any immersion method that will produce a uniform low brass color on either yellow brass castings or rolled stock that will be satisfactory as to color or wearing qualities. For all around uniform results at a low cost it is better to electro-plate in a bronze solution made up as follows:

Copper cyanide	3 oz.
Zinc cyanide	½ oz.
Sodium cyanide	4½ oz.
Sodium carbonate	1 oz.
Rochelle salts	2 oz.
Water	1 gal.

Use at 110° to 120° F.; either cast bronze or electrolytic copper anodes; current density, 6 amperes per square foot.

By adjustment of current and temperature any shade between copper and yellow brass may be produced. The work should be plated sufficiently to stand bright dipping, which will bring out the color of the deposit and have good wearing qualities.

W. F., Problem 4,064.

Patents

A Review of Current Patents of Interest

Printed copies of patents can be obtained for 10 cents each from the Commissioner of Patents, Washington, D. C.

1,784,987. December 16, 1930. **Tank for Chromium Plating.** C. Roy Gleason, Chicago, Ill.

A tank for containing the electrolyte for use in the electrodeposition of chromium, comprising a container composed of any suitable material and a lining of lead and then lined with glass.

1,785,139. December 16, 1930. **Process of Producing Metallic Cadmium from Cadmium-containing Material.** Hanson H. Monroe, Painesville, Ohio, assignor, by mesne assignments, to The Grasselli Chemical Company, Cleveland, Ohio.

The process of recovering metallic cadmium from zinc and cadmium bearing material, which comprises submitting said material to the action of a molten caustic alkali in the presence of a carbonaceous reducing agent.

1,785,245. December 16, 1930. **Removal of Lead Coatings from Metallic Articles.** Kiel B. Bowman, Massillon, Ohio, assignor, by mesne assignments, to Republic Steel Corporation, Youngstown, Ohio.

The method of removing the lead coating from lead coated articles, which consists in treating the articles with an agent which oxidizes the lead coating and then removing the oxidized lead coating by means of an acid.

1,785,247. December 16, 1930. **Recovery of Metallic Elements and Alloys.** Harvey M. Burkey, Plainfield, and Daniel L. Ogden, Woodbridge, N. J., assignors to American Metal Company, Ltd., New York, N. Y.

The method of recovering copper and zinc from waste alloy material containing these elements, which comprises smelting the alloy material, separating a fume containing the zinc from the gases evolved by the smelting operation, leaching the fume with a solvent for the zinc and recovering the zinc from the solution.

1,785,283. December 16, 1930. **Process for Producing Lamelliform Metal Powders.** Emil Podszus, Berlin-Friedrichshagen, Germany, assignor to Hartstoff-Metall Aktiengesellschaft (Hametag), Berlin-Copenick, Germany.

The method of producing a lustrous metal product composed of lamelliform particles for use in the manufacture of bronze paints, comprising subjecting the particles of previously finely comminuted metal to continual impact between a large number of tiny steel balls by imparting to said steel balls a revolving motion.

1,785,372. December 16, 1930. **Alloy.** Jonathan Newton White, New York, N. Y.

An alloy comprising 93 to 95% copper, 1 to 1¼% manganese, and the balance zinc.

1,785,389. December 16, 1930. **Process for Controlling Electroplating.** Robert J. Piersol, Pittsburgh, Pa.

A plating system including a plating solution having two electrodes therein, and means for supplying a plating current thereto comprising a source of alternating current, a transformer having its primary winding connected to said source, and rectifying means connected between the secondary winding of the transformer and the electrodes in the plating solution, and means for controlling the amplitude and the phase condition of the current supplied to the rectifying means.

1,785,493. December 16, 1930. **Method of Making Plated Shot.** Edwin Pugsley, New Haven, Conn., assignor, by mesne assignments, to Winchester Repeating Arms Company, a Corporation of Delaware.

The process of making plated lead shot which comprises dropping globules of molten lead into a solution of a metallic salt containing a metal adapted to replace the metal of the salt when lead is dipped in the solution whereby the globules are formed into shot and plated with the metal of the salt.

1,785,774. December 23, 1930. **Plastic Heat-Treated Aluminum Alloy.** Noak Victor Hybinette, Wilmington, Del., assignor to Hybinette Patents Corporation, Jackson, Mich., a Corporation of Michigan. Filed May 18, 1929. Serial No. 364,330. 7 Claims. (Cl. 148—32.)

A highly ductile, fully heat-treated aluminum alloy commercially free from inter-crystalline corrosion, composed of from .50% to 1.0% zinc, .50% to 1.0% magnesium, .05% to .15% cadmium, and copper, nickel, cobalt, manganese, chromium, tungsten and molybdenum in quantities not exceeding .25% of each and in total not exceeding .50%.

1,786,398. December 23, 1930. **Protective Metal Coating and Process and Apparatus for Producing the Same.** Colin G. Fink, New York, N. Y., and Charles H. Eldridge, Metuchen, N. J., assignors to Chemical Treatment Company, Inc., New York, N. Y.

The process of producing protective and resistant coatings, comprising electrodepositing a relatively thin plate of the coating metal on an article, exposing the plate to gas at sub-atmospheric pressure, and resuming plating, thereby to produce a coating free from so-called "pin-hole" defects.

1,786,592. December 30, 1930. **Electroplating Apparatus.** Kazimierz Baranowski, Paris, France, assignor to Wladimir J. Einstein, London, England.

In electro-plating apparatus the combination of an electrode, a rotatable cleaning brush in contact therewith and vanes upon the cleaning brush so located as to move the electrolyte radially through the brush bristles over the electrode surface.

1,787,431. January 6, 1931. **Electroplating Device.** Peter J. F. Batenburg, Racine, and Cyril J. Atkinson, Milwaukee, Wis.; said Atkinson assignor to said Batenburg.

In an electro-plating device, the combination of a pointed almond-shaped holder having flat, substantially parallel top and bottom surface and adapted to receive an impregnated pad thereon, and means for securing said anode plate to the bottom surface of said holder including a terminal stud extending transversely through said holder to said top surface.

1,787,477. January 6, 1931. **Process for Chromium Plating.** John A. Hanley, Irvington, N. J., and Walter L. Pinner, Detroit, Mich., assignors, by mesne assignments, to General Spring Bumper Corporation, a Corporation of Michigan.

In a process for chromium plating, the succession of steps comprising cleaning the article as a cathode in an alkaline bath, dipping in an acid bath, rinsing, placing immediately in a chromium plating solution and turning on the current when the article has been in the solution about five seconds.

1,787,621. January 6, 1931. **Puddling Device.** William J. Fiegel and Winfield S. Enderich, Detroit, Mich., assignors to Bohn Aluminum and Brass Corporation, Detroit, Mich., a Corporation of Michigan.

In a puddling device, a crucible, an agitator, means for rotating said agitator, and means independent of the rotating means for the agitator for moving said agitator in an arcuate path from a position within said crucible and below the normal level of the molten metal therein to a position above the normal level of the molten metal.

1,788,185. January 6, 1931. **Method of Treating Molten Magnesium and Its High-Percentage Alloys.** Adolf Beck, Walter Schmidt, and Gustav Schreiber, Bitterfeld, Germany, assignors to I. G. Farbenindustrie Aktiengesellschaft, Frankfort-on-the-Main, Germany.

A method of protecting a jet of molten magnesium and high-percentage magnesium alloys from oxidation, comprising the step of keeping the point of issue of the metal from the pouring vessel in a substantially fixed position relative to the gate of the receiving mold whereby the jet of metal between the pouring vessel and the receiving mold in contact with the air forms a rigid hose through which the remainder of the metal in the pouring vessel can flow without contact with the air.

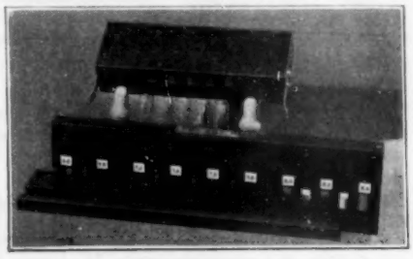
Equipment

New and Useful Devices, Metals, Machinery and Supplies

New Nickel pH Comparator

Research by several laboratories has shown that the colorimetric method ordinarily used for determining the pH of nickel electroplating and electrotyping baths gives values which vary as much as 0.6 pH from the true values obtained on the same solutions by means of the standard hydrogen electrode, says W. A. Taylor and Company, Baltimore, Md. In order to eliminate this difficulty and place all determinations on an equal basis, Taylor and Company have developed a new nickel pH comparator, they state. This set is so designed that determinations made with it check those made with the hydrogen electrode within 0.1 pH, it is claimed.

The new comparator is said to be unique in design and construction. Molded from bakelite, it combines the maximum of durability, precision, convenience and simplicity, according to the makers. It consists of two principal parts, the slide and the base. The slide is a bakelite case 10" long, 2¾" high and ⅝" thick. It contains 17 vertical holes and 17 horizontal slots which pass through the exact centers of the holes. In these holes are placed the 9 color standards for the nickel pH indicator (4.8, 5.0, 5.2, 5.4, 5.6, 5.8, 6.0, 6.2 and 6.4) and 8 ampules of distilled water, these ampules alternating with the color standards, and held in place by a lid screwed on the top of the slide.



Taylor Comparator Set for Testing pH of Nickel Plating Solutions

The base consists of two parts. The lower part has a slot in which the slide may be moved back and forth; two holes containing vials of the nickel pH indicator solution, with pipettes and nipples; five holes containing test tubes; and a closed compartment for a ground glass plate. Vertical slots run through the three central holes in the base holding the test tubes, these slots corresponding exactly with any three of the slots in the slide. The upper part of the base serves as a cover for the vials and test tubes when the set is not in use.

In making pH determinations, top is removed from base, three test tubes are filled with sample solution to the mark (5cc) and placed in the three holes back of the slots in the base. To the central tube 0.5cc of the nickel pH indicator solution is added by means of the pipette and nipple and the contents thoroughly mixed. Slide containing color standards is placed in position on the base and, holding instrument toward a window or other source of daylight, slide is moved back and forth in front of test samples until a color match is obtained. The pH is then read directly from values given on front of slide.

Comparator, of bakelite, is unaffected by water, acids or alkalis, will not warp or come apart, the makers state. Molding provides machined precision said to be impossible with wood or sheet metal. There are no loose standards to be inserted and removed in making determinations, so that all chance of loss or breakage from handling individual standards is eliminated. All color standards and test tubes have 11.5 mm. outside diameter. This makes the set small, compact and readily portable. Of far greater practical importance, however, is the fact that the resulting thinness of layer of material being tested enables one to make accurate determinations on far more highly colored and turbid materials, without dilution, than is possible with larger tubes, the company says.

The fact that determinations are made simply by sliding the color standards in front of the test sample until a color match is obtained makes the operation of the set extremely simple, so that it is possible to teach a workman to use the set accurately with a few minutes instruction, the makers add.

Polishing Wheel Balancing Stand

A device for balancing polishing wheels is offered by Excelsior Tool and Machine Company, East St. Louis, Ill. This stand fastens on the bench or can be used portably. It balances wheels from smallest up to 18 inches in diameter and 4½ inches thick. Top runners are made of round tool steel rods, ground and polished at 7/16 in. size, which may be turned when top surface becomes worn enough to affect accuracy. Perfect balance of polished wheels is stated by the makers of the device to be essential for best results and economical operation. Wheels off balance are said to affect the work as well as the life of the machine on which the wheels are used. The stand of the device is 28 inches long, 7 inches wide, 8 inches high; it weighs 40 pounds; one arbor is supplied with it, additional sizes are supplie on order. Wheels being set up, glued, etc., are placed on the balancing stand and allowed to roll the length of the stand. The wheel is then weighted to offset heavy sides, until it stands still at any point of the stand, on any side of the arbor.

Wheel Balancing Stand

Motorized Speed Reducers

The Production Equipment Company, 5319 Windsor Avenue, Cleveland, Ohio, is manufacturing motorized speed reducers in capacities up to and including 20 horsepower.

The motorized speed reducer is described as a compact, efficient unit that solves many difficult drives in industry. The unit consists of a standard heavy duty electric motor with integral planetary gear-reduction unit mounted in an oil-tight housing.

All motors are built by The Production Equipment Company and can be supplied in single speed, multi-speed, enclosed and high torque designs for either horizontal or vertical mounting. The motorized speed reducer provides straight-line drive with final driving speeds as low as 50 to 550 R.P.M.

Bulletin No. 625 will be mailed to our readers on application to the company. It gives all details of construction.

New Air Grinders

The Madison-Kipp Corporation of Madison, Wis., recently announced the addition of three new ball bearing, high speed models to its line of air grinders. The new models operate at 60,000 to 100,000 revolutions per minute.

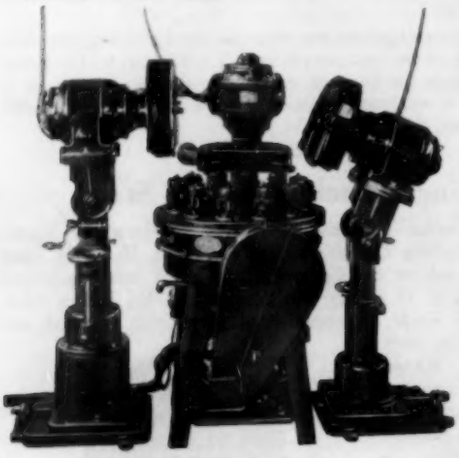
Model "BBL" is a low pressure grinder, designed to develop 60,000 r.p.m. on 30 to 50 pounds air pressure. Model "BB" also operates at a speed of 60,000 r.p.m., but requires pressures of 50 to 100 pounds. Model "BB-100" requires 100 to 120 pounds pressure, and operates at 100,000 r.p.m. Each of the models is small enough to be held in the hand.

To reduce friction, the new models are equipped with ball bearings at top and bottom. Lubrication is through the spindle, which is hollow and cross drilled.

Automatic Metal Polishing Machine

A new type of automatic buffing and polishing machine which performs three operations with one handling of the article is announced by The C. I. Packer Tool and Die Company, Meriden, Conn.

The machine is known as the "Cipco." It is said to be adaptable to many kinds of work measuring up to 7½ inches in diameter. Changeovers are said to be rapid due to specially designed expansion chucks. Increases of from 300% to 500% polishing room output as compared with other methods are claimed by the manufacturer. Operation is described as follows:



Automatic Metal Polisher

The table of the machine is operated by a multi-speed motor, allowing the table, which revolves with intermittent motion, to be run at four speeds. The period of dwell while the work is in contact with the wheels is determined by the nature of the work. As the spindles revolve to a position directly in front of the operator, the jaws of the chuck holding the work contract automatically. This action controls four spindles simultaneously, allowing the operator time for removing finished work and reloading.

The expansion of the chuck jaws occurs automatically just before the work makes contact with the first wheel, and they hold the work securely throughout the polishing or buffing operations. The only special requirement is that the adapter jaws must be made to fit the size of each particular line of work.

Complete information may be had by addressing the manufacturer.

Metal Cleaning and Coating Compounds

A new type of compound for cleaning nonferrous metals in connection with finishing operations of various kinds is offered by the Quigley Company, Inc., 56 West 45th Street, New York, manufacturers of foundry and finishing equipment and supplies and other products used in metal and other industrial plants.

The Quigley cleaner for metals is known as "Annite Yellow Label." The substance is dissolved in water before using, and is stated by the manufacturer to be applicable to all nonferrous metals, including aluminum, brass, bronze, copper, lead, nickel, silver, tin, zinc, and alloys of these metals, such as solder, white metals, etc. The company states that "Annite Yellow Label" will cleanse nonferrous metals suitably before plating, lacquering, painting, galvanizing, japanning, enameling, assembling, inspection or stocking. It is said to provide the clean surface necessary before many finishing processes.

Another product of the Quigley Company is "Triple-A Protective Coating," made in black, white, clear and twelve colors. This finishing material is stated to have the properties of good adherence to metal, concrete, plaster, brick, wood, cork, stone, etc.; high resistance to corrosion and erosion; homogeneity which eliminates cracking or peeling; coverage capacity of 300 to 400 square feet of metal surface, 200 to 300 square feet of wood surface, or from 100 to 200 square feet of brick or concrete, to the gallon for first coats, and from 300 to 400 square feet to the gallon for second coats; brushes or sprays; washable with caustic soda, lye, potash and other cleaning agents; withstands changes in temperature and can be used effectively on piping in plants.

Complete information on Quigley products may be had by readers who will address the company directly.

New Sandblaster's Helmet

The Pangborn Corporation of Hagerstown, Md., announces an all-rubber sand blast helmet, to be known as the type "DE." The maker states it protects the wearer's eyes, flesh and lungs, and protects the buyer against replacement expense. It can be repaired in a manner similar to patching a tire tube. It has been tested under sand blast conditions where it has displayed dependability and good wearing qualities.

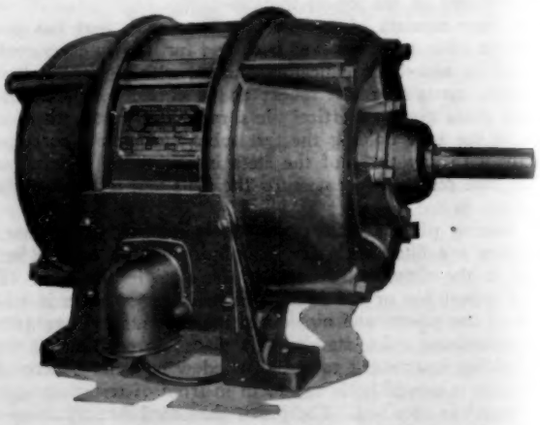
Sandblaster's Helmet

The helmet is equipped with a curved window, giving true vision, protected by a bulged screen. Both glass and screen are easily replaceable. Piped into the back of the helmet, at any desired pressure, fresh air is kept circulating for breathing, and a fixed jet above the soft, special sweat band, cools the head. Air sprayed on the outside of the visor, through holes above it, keeps dust from fogging the visor window.

Another interesting feature applicable to this helmet is the Pangborn type "B" air washer, which supplies the operator with clean, water-washed air practically at atmospheric pressure.

Unit Type Motor

The Ideal Electric and Manufacturing Company, Mansfield, Ohio, has developed a complete series of electric motors that are said to represent a radical departure from the ordinary type and design familiar to users of electrical power units; the new product is called the "Unit Type" motor. These motors present many new design features of considerable interest. By placing the motor feet on the bearing brackets all load shocks and strains are carried directly to the motor support. Shock loads or vibration will not affect the live elements or weaken the assembly of this motor.



Induction Motor of Unit Type Construction

The motors are built with standardized units (rotors and stators) which are perfectly interchangeable for all types. There is no limit to the mechanical combinations possible through the use of these standardized rotor and stator units.

Interchangeable standardized rotor and stator units, end brackets, bearings, and bases apply not only to squirrel cage induction motors, but also to slip ring induction motors and direct current motors. Accessibility and interchangeability of these motors makes it possible for them to be built into machinery where heretofore it has been impossible or undesirable to incorporate an individual motor drive, the maker states. Interchangeable ball, roller or

sleeve bearings; anti-friction bearings are supplied as standard because of their many advantages. The sleeve bearing housings are of a new design that can be rotated for wall or ceiling mounting without removing the bearing brackets and these sleeve bearings can also be replaced without removing the bearing brackets or dismantling the motor. Insulation of motor windings is of utmost importance and has received careful attention in "Ideal" unit type motors.

The "Ideal" unit type equipment is made as standard squirrel cage induction motors, slip ring induction motors and direct current motors in all types of mechanical construction and electrical characteristics. The squirrel cage induction motors are made in four standard designs as regards starting torques and starting currents. Special designs are made to suit any set of specifications.

All unit type motors are designed to meet the standard torques, power factors, efficiencies, heating specifications, dielectric tests and other performance guarantees and also the uniform mounting dimensions established by the National Electrical Manufacturers' Association. They are furnished in sizes from ½ to 200 horsepower.

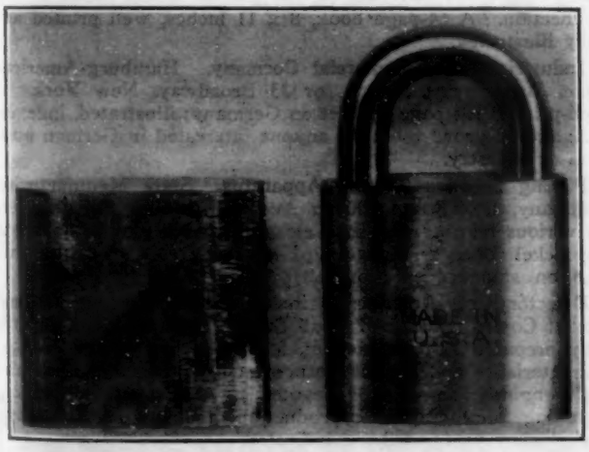
The new series serves as a companion line to the Ideal synchronous motors that the company has been furnishing to industry for many years.

Acid Brushes

"Griptite Resistor," a new type of acid brushes, have been placed on the market by the Cleveland Acid Swab Company, 2003 Marlowe Avenue, Cleveland, Ohio. They are said to represent an interesting development. Hitherto acid brushes have been made with hair or bristles, which, although perfectly satisfactory for applying "killed spirits," undergo rapid deterioration when exposed to many other acids and alkalies. It is pointed out that a brush composed of fine aluminum wire is capable of resisting the action of the strongest nitric acid for long periods, and that organic acids are equally powerless to affect it. Monel metal is another type of wire employed for corrosive materials. For other purposes, stainless steel wire or other suitable resistant material is used. The company offers to submit sample brushes to meet specified requirements. Higher initial cost of some of these brushes, it is stated, is offset by increased length of life.

Extruded Brass for Padlocks

A survey was recently made by A. C. Nielsen Company, Chicago, Ill., engineers, with a view to calculating the economies effected by the use of extruded brass instead of castings for the manufacture of padlocks by a firm described by the Nielsen company as "a large hardware manufacturer." The survey states



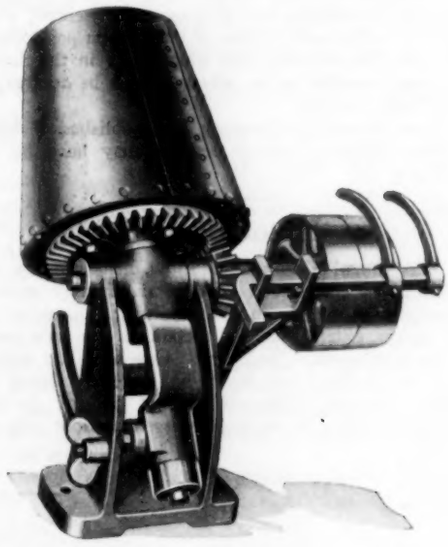
Left, Extruded Brass. Right, the Product

that by using Anaconda extruded shapes in producing padlocks of certain types, large savings were effected in finishing, the economies being large enough to offset the higher cost of extruded metal as compared with castings for the same purpose. Costs of $10.18 per 100 in using cast bodies for the locks were reduced to $8.72 per 100, it is stated. Where 100 bodies, rough cast, weighed 34 pounds, in extruded metal the same number of identical bodies weighed 31 pounds. Scrap from cast bodies amounted to 7 pounds per 100; from extruded metal bodies the scrap was 4 pounds per 100.

The Nielsen survey gives certain other advantages of extruded metal over castings, such as high accuracy of finished product, smoother surfaces, higher strength. The chief advantage, however, is in finishing, no gating, sandblasting or dipping to remove sand, profiling or other prolonged machining being necessary with the extruded metal. Polishing the brass is said to be rated at 100 per hour on cast bodies, whereas it is 130 per hour on the extruded.

Tumbling Barrels

A new product of The Henderson Brothers Company, Waterbury, Conn., is a bench-size tumbling barrel which was designed at the request of customers of the company, according to the makers. The machine is for certain operations which would not be economically performed in a larger machine, such as small



Bench Tumbling Machine

work burnishing, experimental barrel-japanning of small lots for color matching, producing salesmen's samples, etc., or laboratory testing of plated products. The machine is described as compact and strong, practical as a production unit within its capacity limits, which are from 2 to 4 quarts. Machines can be supplied with or without barrels, the latter being of steel, brass or wood, as specified.

The company manufactures in its general line tumbling barrels for all purposes, in a large variety of types and sizes, and with cylinders suitable for the many varying operations performed by this equipment. Barrels of special design are furnished on specification. Readers may obtain complete information by addressing the company.

Insulated Aluminum Wire

General Cable Corporation recently announced a varied line of insulated aluminum wires and cables under the trade name "Alectral." Heretofore, practically all of the aluminum used in the transmission of electrical energy has been in the form of bare conductors. The introduction of "Alectral" wires enables the electrical engineer to employ aluminum wire in a much broader field.

The initial group of insulated aluminum conductors includes such constructions as network cable, non-metallic underground cable, insulated line wire, tree wire, armored cables, magnet wire, starter cable, and car wiring cable. A new departure in connection technique has been developed, together with the required fittings and accessories. Connections will be made by applying high pressures to sleeves by means of a specially designed light weight hydraulic press.

Magnesium Metal Prices Reduced

The Dow Chemical Company, Midland, Mich., recently announced a material reduction in magnesium metal prices. This company has pioneered the development of magnesium in this country. In 1915 the average price for magnesium was $5.00 per pound. Early this year prices ranged from $1.00 to 80c per pound. Two very substantial price reductions took place in 1930. In March reduced prices were announced ranging from 80c to 65c per pound. In November the price was further reduced to 48c per pound on 100-pound and larger lots. Total reductions in 1930 amount to from 32c to 52c per pound. Manufacturing economies, due to improvements in plant processes and larger production, are responsible for the price reductions, the Dow company states, pointing out that the consistent decrease in prices has caused an increase in consumption. In 1921 total consumption in this country amounted to 48,000 pounds; in 1929 it was over 900,000 pounds. The former high cost of magnesium had been largely responsible for its limited use. With the new low prices, consumption is expected to increase materially, and magnesium used increasingly where light weight combined with a high degree of strength and stiffness are essential, as in airplane manufacture. Other advantages of magnesium pointed out are resiliency in absorbing stresses, and adaptability in the manufacture of reciprocating machine parts, where it aids in decreasing wear on bearings, bushings, etc.

The Dow Chemical Company has published a booklet, "The Magnesium Industry," which readers may have by applying to the company.

Motor Boat Show

The 26th Annual Motor Boat Show, held January 16 to 24, at Grand Central Palace, New York, gave further evidence of the increasing use of metals in boat building. Especially noticeable was the larger exterior use of metals, as for side plates, panels, strips, cleats, trimmings, rails, etc. One boat had sides of Monel metal. Most of the boats shown had bronze exhaust nozzles and propellers. Interiors displayed a great deal of chromium plate, applied to decorative furnishings as well as door and other hardware. The small outboard boats are making increasing use of aluminum alloys as a means of reducing weight, and increasing speed and portability; duralumin has been especially favored in this regard, being used for parts of frames as well as outer construction.

The following firms were among the exhibitors, showing products related to metals or finishes:

The American Brass Company, Waterbury, Conn.
Columbian Bronze Corporation, Freeport, N. Y.
International Nickel Company, Inc., New York.
New Jersey Paint Works, Jersey City, N. J.
M. L. Oberdorfer Brass Company, Syracuse, N. Y.
Murphy Varnish Company, Newark, N. J.
Pyrene Manufacturing Company, Newark, N. J.

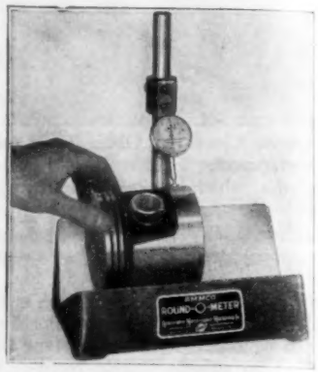
Roundness Meter

A new direct reading indicator that checks roundness and size of any round object from ¾" to 6" in diameter, and gives accurate readings to half thousandths of an inch, is announced by the Automotive Maintenance Machinery Company, 816 West Washington Boulevard, Chicago, Illinois.

The "Ammco Round-O-Meter," it is stated, requires no skill to operate and gives the operator an accurate picture of roundness of pistons, bushings, sleeves, bearings, pins, and all round parts.

By using "Ammco Gauge Setting Rings," the "Round-O-Meter" can also be used for direct measurement and comparative checking.

These gauge setting rings are furnished on special order in any specified diameters, over-sizes or under-sizes, with the range of from ¾" to 6" inclusive.



Roundness Meter

Equipment and Supply Catalogs

Monel Metal Pickling Crates. Weaver Brothers Company, Adrian, Mich. Interesting circular.

Diamond Vulcanized Fibre. Continental-Diamond Fibre Company, New Ark, Del. Illustrated 40-page booklet on fibre and its uses.

Angle Steel and Sheet Metal Equipment. Angle Steel Stool Company, Plainwell, Mich. Catalog M-S, 1931; 30 pages, 8 x 11 inches; illustrated.

Portable Airpainting Units. Paasche Airbrush Company 1909 Diversey Parkway, Chicago, Ill. Bulletin H-30, on units of one to twelve men capacity.

Baird Oblique Tilting Tumblers. The Baird Machine Company, Bridgeport, Conn. Catalog 300, on tumbling equipment; 32 pages, well illustrated.

A New Duriron Product. The Duriron Company, Inc., Dayton, Ohio. Leaflet on a new line of alloy steel valves, resistant to corrosives, pressures, heat.

Better Castings. Niagara Falls Smelting and Refining Company, 2204 Elmwood Avenue, Buffalo, N. Y. Vol. 1, No. 1 of a leaflet devoted to the use of alloys for casting purposes.

Safety Activities in Small Companies. Policyholders Service Bureau, Metropolitan Life Insurance Company, New York. Tenth report in Industrial Safety Series. Copies free on request.

Follansbee Forge Metal Roofs. Follansbee Brothers Company, Pittsburgh, Pa. An excellent color reproduction of a colonial dwelling and surrounding grounds, issued to advertise metal roofing.

Modern Power Plant Equipment. International Nickel Company, Inc., 67 Wall Street, New York. Articles on power plant equipment and data on the use of Monel metal in this connection. A 64-page book, 8 x 11 inches, well printed and fully illustrated.

Industrial and Commercial Germany. Hamburg-American Line, Hamburg, Germany, or 33 Broadway, New York. A well-printed 194-page booklet on Germany; illustrated, indexed, etc.; should prove useful to anyone interested in German business or industry.

Plating Solution Testing Apparatus. State Manufacturing Company, 4724 South Turner Avenue, Chicago, Ill. Leaflets on various instruments, sets, etc., for testing plating solutions for nickel content, sulphates, pH, chromic acid, chlorides, and also on standard solutions.

Directory of American Aircraft Engines. International Nickel Company, Inc., 67 Wall Street, New York. A beautifully prepared 72-page booklet, 8 x 11 inches, giving ratings, characteristics and special features of sixty-five American aircraft engines. A page is devoted to each model described, including photographic reproduction and engineering data. Nickel alloy parts used are indicated.

Ajax Seven Point Ingot. The Ajax Metal Company, Frankford Avenue and Richmond Street, Philadelphia, Pa. Booklet on nonferrous ingots. The company is manufacturing alloys in conformity with the 15 tentative standard specifications of the American Society for Testing Materials, and a table of these specifications is given. There is also a table giving the physical properties of the 15 alloys covered in the specifications, and a table showing examples of the uses of the alloys, together with foundry manipulation and machining characteristics.

Associations and Societies

REPORTS OF THE CURRENT PROCEEDINGS OF THE VARIOUS ORGANIZATIONS

Institute of Metals Division

HEADQUARTERS, 29 WEST 39th STREET, NEW YORK

Annual Meeting February 16 to 19

The annual meeting of the Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers will take place February 16 to 19, inclusive, when the A. I. M. E. holds its 140th meeting. The event takes place at New York, the technical sessions being held in the auditorium of the Engineering Building, where the Institute's headquarters are. Other events, such as the annual dinner, various luncheons, the annual smoker, a dance, etc., will be held in various places which will be given in the program with which all who attend are provided.

Institute Plans

Three sessions, the Annual Lecture and a dinner are planned by the Institute of Metals Division. A symposium on working metals accounts for two sessions, to be held Wednesday afternoon and Thursday morning, February 18 and 19, and on Thursday afternoon there will be a general session. The latter will be held in the Auditorium and will be adjourned at 4 o'clock when Dr. Arne Westgren will deliver the Annual Lecture, his subject being "X-ray Determination of Alloy Equilibrium Diagrams." As the papers for the general session work in well with the lecture, a profitable afternoon is assured. Thursday evening the annual dinner will be held in the north ballroom of the attractive new Hotel New Yorker. Dr. G. W. Thompson of the National Lead Company will be the dinner speaker. His subject will be "Lead and Tin." The program is as follows:

Technical Program

X-RAY DETERMINATION OF ALLOY EQUILIBRIUM DIAGRAMS. (Institute of Metals Division Annual Lecture)—by Arne Westgren.

METAL WORKING IN POWER PRESSES.—by E. V. Crane.

FORMING PROPERTIES OF THIN SHEETS OF SOME NONFERROUS METALS.—by W. A. Straw, M. D. Helfrick and C. R. Fischrupp.

DIE PRESSING OF BRASS AND COPPER ALLOYS—by John R. Freeman, Jr.

PLASTICITY OF COPPER-ZINC ALLOYS AT ELEVATED TEMPERATURES—by Alan Morris.

A FEW FACTS ABOUT MANGANIN—by M. G. Corson.

NICKEL-CLAD STEEL PLATE WORK—by William G. Humpton, F. P. Huston and Robert J. McKay.

DIRECTIONAL PROPERTIES IN COLD-ROLLED AND ANNEALED COPPER by Arthur Phillips and E. S. Bunn.

PLASTIC DEFORMATION—by F. Wever.

EFFECT OF COMBINATIONS OF STRAIN AND HEAT TREATMENT ON PROPERTIES OF SOME AGE-HARDENING COPPER ALLOYS—by W. C. Ellis and E. E. Schumacher.

CONSTITUTION OF HIGH-PURITY ALUMINUM-TITANIUM ALLOYS—by William L. Fink, Kent R. Van Horn and P. M. Budge.

SUPPRESSED CONSTITUTIONAL CHANGES IN ALLOYS—by G. Sachs.

STUDIES UPON THE WIDMANSTÄTTEN STRUCTURE, II—THE BETA COPPER-ZINC ALLOYS AND THE BETA COPPER-ALUMINUM ALLOYS—by Robert F. Mehl and O. T. Marzke.

A THERMODYNAMIC STUDY OF THE EQUILIBRIA OF THE SYSTEMS ANTIMONY-BISMUTH AND ANTIMONY-LEAD—by Yap, Chu-Phay.

American Electroplaters' Society

Bridgeport Branch

HEADQUARTERS, CARE OF T. H. CHAMBERLAIN, 859 ORANGE STREET, NEW HAVEN, CONN.

Banquet Committee Appointed

The Bridgeport Branch of the American Electroplaters' Society will hold its annual educational session and banquet Saturday, March 21, 1931, at the Stratfield Hotel, Bridgeport, Conn. The following committee has charge of the arrangements:

William Ehrencrona, chairman; John Oberender, Ray O'Connor, Fred Norgren, George Knecht, William Flaherty, William Stratton, Ben Kuterer.

New York Branch

HEADQUARTERS, CARE OF JOHN E. STERLING, 2581 FORTY-SIXTH STREET, ASTORIA, LONG ISLAND, N. Y.

Annual Session and Banquet—1931

The annual educational session and banquet of the New York Branch of the American Electroplaters' Society will take place February 21, 1931, at the Aldine Club, 200 Fifth Avenue (corner 23rd Street), New York City.

The educational session will begin at 3:30 P. M. Charles H. Proctor will preside. A good program of papers has been prepared and all platers, chemists and plant officials are urged to attend and gain the benefit of the large amount of valuable technical information that is to be presented. Ample opportunity will be afforded for discussion of the papers. No tickets are necessary for attendance at the educational session.

The banquet will begin at 7:00 P. M., and all members are requested to make reservations early by communicating with the secretary, Mr. Sterling, whose address is given above. Members are urged to bring the ladies and to invite friends as well. Tickets should be obtained in advance, and, if possible, before February 14.

A good program of entertainment is promised. There will be a party for the ladies in the afternoon, while the educational session is being held, from 3:30 to 6 P. M. There will be prizes for the ladies. The banquet will be followed by dancing.

Boston Branch

HEADQUARTERS, CARE OF ANDREW W. GARRETT, 45 KING STREET, DORCHESTER, MASS.

Platers' Class

Boston Branch, American Electroplaters' Society, has organized a class in electroplating and principles of chemistry. It has been enthusiastically received, with over twenty platers already attending and each week showing an increase.

The plan was conceived early in the year, and a committee was directed to attend to getting equipment and a place to hold the class. After investigating the methods of some of the other branches which have classes, a laboratory was obtained in the Coyne Engineering School, Boston; chemical equipment was purchased; William Cahill, former chemistry instructor at Holy Cross College and who has had considerable practical chemical experience, was obtained as instructor.

The plan was effected largely through the unselfish efforts of Charles F. Campbell, president of the Boston Nickel Plating Company, and Bart. Lee of Boston Platers Supply Company, both of whom gave considerable time to the matter.

St. Louis Branch

HEADQUARTERS, CARE OF C. T. McGINLEY, 8214 FAIRHAM AVENUE, ST. LOUIS, MISSOURI

The annual banquet and educational session of the St. Louis Branch of the American Electroplaters' Society was held on January 24, 1931, at the Hotel Chase, St. Louis. The educational session was directed by Dr. L. E. Stout of Washington University, who demonstrated new methods of chemical control, analysis, etc.

Waste Material Dealers Association

HEADQUARTERS, TIMES BUILDING, NEW YORK

The eighteenth annual convention of the National Association of Waste Material Dealers, Inc., is to be held at the Congress Hotel, Chicago, Ill., on March 16th, 17th and 18th. On account of the many important problems before the industry at this time the Association will throw its business sessions open to the entire industry and many non-members are expected to attend.

A speaker of prominence is expected to address members of the Metal Division. On Wednesday, March 18th, there will be held meetings of the Salvage & Reclamation Division, followed by the annual meeting, and the convention will close with the eighteenth annual banquet, which is to be held on the evening of March 18th.

National Metal Exchange

HEADQUARTERS, 27 WILLIAM STREET, NEW YORK CITY

The annual election of officers of the National Metal Exchange was held in January. The following were elected:

Ivan Reitler, president; Addison B. Hall, first vice-president; Clarence B. White, second vice-president, and Martin H. Wehncke, treasurer.

Those elected to the governing board were Leo Auman, Harold L. Bache, J. Chester Cuppia, Floyd Y. Keeler, Jerome Lewine, Kuo Ching Li, Irving J. Louis, Leo Lowenstein, George M. Pynchon, Jr., Erwin Vogelsang and Benno Elkan.

American Society for Testing Materials

HEADQUARTERS, 1315 SPRUCE ST., PHILADELPHIA, PA.

Activities in Non-Ferrous Metals and Alloys

Of outstanding importance in the work of the American Society for Testing Materials during the past year, in the field of non-ferrous metals and alloys, is the publication of a new List of Alloys, prepared by Professor William Campbell of Columbia University, chairman of the society's Committee B-2 on Non-Ferrous Metals and Alloys. This is a modification and a revision of Campbell's earlier list issued in 1922, and it includes, in addition to the chemical compositions, the physical properties of some typical alloys. It is published under the auspices of Committee B-2.

Of particular significance in the Society's committee activities is the assignment of the work on die-cast metals and alloys, formerly handled by Subcommittee XV of Committee B-2, to a new separate standing committee, Committee B-6 on Die-Cast Metals and Alloys, with H. A. Anderson, Western Electric Company, Oak Park, Ill., as chairman, and P. V. Faragher, Aluminum Company of America, Pittsburgh, Pa., as secretary. The extensive investigation carried out by this committee on 21 typical alloy compositions, involving the tests on some 75,000 test specimens, has been continued.

Of interest in connection with the work of this committee are several papers presented during the year, namely a paper by W. M. Peirce on "Metallography of Zinc-Base Die-Cast Alloys," appended to the report of the committee; a paper by D. L. Colwell on "Development of Zinc-Base Die-Casting Alloys," an individual contribution at the annual meeting; and a paper by Charles Pack, presented in connection with a Symposium on Automotive Materials, held under the society's auspices in Detroit last March.

Committee B-1 on Copper Wire revised two of the specifications, namely Standard Specifications for Bronze Trolley Wire and the Standard Specifications for Round and Grooved Hard-Drawn Copper Trolley Wire, to include a larger size wire, namely, 350,000 circular mills. This revision was developed in conjunction with the American Mining Congress, the National Electric Light Association and the American Electric Railway Engineering Association. The committee now has actively before it the development of specifications for copper wire and cable for transmission purposes.

Committee B-3 on Corrosion of Non-Ferrous Metals and Alloys reports progress on its program of exposure tests. Specimens of a number of different alloys are being made and these will be placed on racks at several exposure locations.

Of outstanding importance was the preparation, by Committee B-5 on Copper and Copper Alloys, Cast and Wrought, of the revised Specifications for Copper Base Alloys in Ingot Form for Sand Castings. These specifications include requirements for 15 alloys intended to represent the complete range of alloys required in the industry. It is expected that through the use of these specifications a considerable simplification can be effected, through the elimination of a number of compositions differing but slightly in specific requirements. These specifications were developed in cooperation with the American Ingot Metal Institute.

Committee B-7 on Light Metals and Alloys, Cast and Wrought, in addition to revising the Tentative Specifications for Aluminum Base Alloy Sand Castings and the Tentative Specifications for Aluminum-Base Sand-Casting Alloys in Ingot Form, developed three new tentative Specifications, namely, Tentative Specifications for Aluminum (Duralumin) Alloy Sheet, Tentative Specifications for Aluminum-Manganese Alloy Sheet, and Tentative Specifications for Magnesium-Base Alloy Castings.

A number of papers important in the non-ferrous metals field were presented as individual contributions during the year, either at the Society's annual meeting in June or at the regional meeting in Detroit in March.

British Institute of Metals

HEADQUARTERS, 36 VICTORIA STREET, LONDON, ENGLAND

The twenty-third Annual General Meeting will take place in the Hall of the Institution of Mechanical Engineers, Storey's Gate, London, S. W. 1, Wednesday and Thursday, March 11 and 12. Besides the regular business, a program of technical papers will be presented. Abstracts of these will appear in this journal later. Election of the Council will be held, the following being scheduled for election, having been nominated: Dr. Richard Seligman, president; A. G. C. Gwyer and Professor D. Hanson, vice-presidents; H. W. Brownsdon, Professor C. H. Desch, John Fry, H. H. A. Gree, J. L. Haughton, members of council.

British Electroplaters' Society

HEADQUARTERS, NORTHAMPTON POLYTECHNIC INSTITUTE, ST. JOHN STREET, LONDON, E. C. 1, ENGLAND

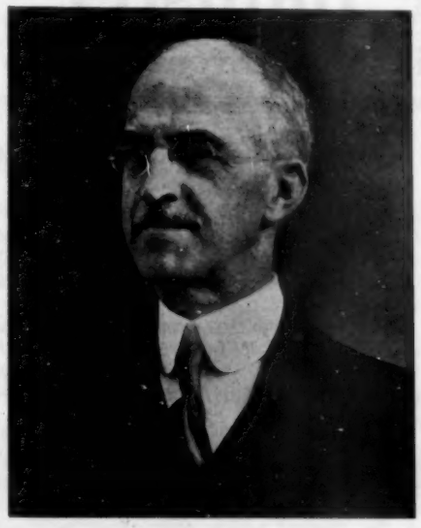
Electroplaters' and Depositors' Technical Society of Great Britain, as previously announced in these columns, invites American platers and chemists to apply for membership. It is now announced by the secretary, S. Wernick, that the time for entrance as the special rate has been extended to March 1; it had previously been the intention to end this period January 1, 1931. Those interested should communicate with either the secretary in London (address above), or with Dr. E. B. Sanigar, 5042 Stenton Avenue, Philadelphia, Pa., who is representing the Society and is authorized to receive subscriptions.

Personals

Frank J. Gorse

By E. H. DAVIS

Frank J. Gorse, Assistant Treasurer of the Scovill Manufacturing Company, completed in September his fiftieth year of continuous service with the company, thus joining the ranks of the distinguished list of half-century employees. Born in New York City, Mr. Gorse came to Waterbury in the very beginning of his business career, attracted, doubtless, by the fact that his cousin, the late President Chauncey Porter Goss, was then treasurer of the Scovill Company and was looking for an assistant for the office work. At that time the plant was employing less than 350 people, although it represented the very sizeable capital of one-third of a million dollars, with a surplus and reserve of over one-half million dollars. The business office of the company was confined to two or three desks in a single room, where all correspondence was received and opened by the treasurer. The business was classified and sorted at another desk presided over by the late C. M. DeMott, and the orders were then passed over to Mr. Gorse for the proper record and assignment to the plant. Subsequently, the work of Mr. Gorse became more and more closely associated with that of Mr. DeMott, and not only orders but also invoices and the plant payroll were handled and controlled by them at a single desk.



FRANK J. GORSE

The development of our company since 1880, when Mr. Gorse joined its staff, has become well known. In no part of the plant was this development more decisively recorded than in the volume and complexity of matters which had to pass through the office of Mr. DeMott and Mr. Gorse. It is doubtful whether any half-century will show such astonishing evolution in the amount and variety of plant business as Mr. Gorse has surveyed in the course of his experience here. On February 24, 1920, by formal action taken by the directors of the company, Mr. Gorse was made assistant treasurer of the company and has retained that corporate office ever since.

Mr. Gorse has established many personal associations in the plant during the long period of his service here and has closely identified himself with the interests of the First Methodist Church, of which he has been a member during his entire residence in Waterbury. Both in that group and in the Scovill family he has many friends who will be interested and surprised to be reminded that his quiet but valuable contact in these important relations has now attained so significant a period. In extending our congratulations to Mr. Gorse and to the company, we add the sincere wish that he may add another quarter century to the proud record which is now his.

Samuel H. Worswick has resigned as Pacific Coast representative of the Taylor Instrument Company, Rochester, N. Y. Mr. Worswick was with this firm for the past sixteen years, with headquarters in San Francisco.

F. Frank Dorney has been appointed assistant to works manager, Walworth Company, Boston, having formerly been supervisor, rating and methods division. Mr. Dorney has been associated with Walworth Company since 1923.

Emil Zeiders has joined the Gilbert Spruance Company, Philadelphia, Pa., manufacturers of lacquers, and will cover the New Jersey and downtown New York City territories as sales representative. Mr. Zeiders is a graduate of the University of Illinois.

Walter F. Graham, technical director of the Caskey Brass and Bronze Works, Inc., Philadelphia, Pa., was chairman of the round table discussion group on malleable cast iron at the Fifth Annual Foundry Conference, held under the auspices of the University of Wisconsin, February 3 to 5, 1931, at Madison, Wis.

Thomas W. Pangborn, president of the Pangborn Corporation, Hagerstown, Md., was recently elected to the board of directors of the Equitable Trust Company, Baltimore. Mr. Pangborn is also a director in the Maryland-Virginia Joint Stock Land Bank of Baltimore, and the Hagerstown Bank and Trust Company.

C. H. Keeney has been appointed sales manager by the Northern Blower Company, Cleveland, Ohio, manufacturers of exhaust fans, suction filters, fume recovery, sand blast rooms, core ovens, air separators, exhaust systems, cyclones, dust arresters, dust collecting systems and kindred products. Mr. Keeney has been identified with this line of manufacture for about twenty-five years.

P. J. McIntyre, who for the past 7 years was associated with the Wolverine Tube Company as Research and Chief Engineer, has resigned his position with that company and has opened an office under the name of McIntyre Engineering Company, 403 West Baltimore Ave., Detroit, Mich. He will devote his time as consulting engineer for brass and copper tube products and production machinery for this class of work.

Robert S. Archer has resigned his position as research metallurgist for the Aluminum Company of America and the Aluminum Castings Company, Cleveland, Ohio, to become director of metallurgy for the A. O. Smith Corporation, Milwaukee, Wis. Mr. Archer is widely known as an authority on metals; in collaboration with Dr. Zay Jeffries he is author of "The Science of Metals." Mr. Archer is a graduate of the University of Michigan, where he received bachelor's and master's degrees in science.

Obituaries

William Glan Harris

W. G. Harris, president of Canada Foils, Limited, Toronto, Ontario, and president of Canada Metals Company branch of the National Lead Company of Canada, died in New York on January 9, 1931.

Mr. Harris and his son, W. G. Harris, Jr., who died a few years ago, built up one of the largest organizations in the manufacture of metal products in Canada and during the war made a very large quantity of shrapnel and other forms of munitions. In 1929 the Canada Metal Company was merged with the National Lead Company of Canada but Mr. Harris continued to take an active interest in the business.

A few years ago he formed Canada Foils, Limited, for the manufacture of tin, aluminum and other metal foils.

Mr. Harris had many friends in the New York metal trade who

will regret the passing of another of the old race of sturdy men who were associated with the solid growth of the metal trade of the past era and impressed their personality upon it by their enterprise and their honorable and straightforward dealing. Through the death of Mr. Harris, the Canadian metal trade loses one of its pioneers.

Carlton B. Coe

Carlton B. Coe, secretary and general manager of the Steele and Johnson Manufacturing Company, Waterbury, Conn., died suddenly of a heart attack on January 22, 1931. Mr. Coe was fifty-five, a member of one of Waterbury's oldest families. He was a brother of John A. Coe, president of the American Brass Company, and of Herbert W. Coe, vice-president of the Waterbury Brass Goods Corporation, both of whom survive him.

Mr. Coe was born in Beacon Falls, Conn., September 7, 1875, the son of the late John Allen Coe and Cornelia A. (Wakelee) Coe.

He came to Waterbury about 1912, when he was transferred from the New York offices of the Steele and Johnson Company.

W. R. B.

News of the Industry

Industrial and Financial Events

Empire State Mooring Mast

The new 86-story Empire State Building in New York City, reaching a quarter of a mile above 5th Avenue at 34th Street, is being equipped with a 200-foot mast for mooring dirigibles. This mast, which will take a side pull of 50 tons and which, in addition, is windbraced for a gale of 120 miles per hour, will have a shuttle elevator to carry passengers from the main observatory on the 86th floor to a glass-enclosed observation gallery at the top of the mast. The entire structure of this mooring mast is being sand blasted by machines built especially for this purpose by the Pangborn Corporation, Hagerstown, Maryland, well-known producers of metal sandblasting equipment.

Winchester Arms in Receivership

In order to conserve the company's property and to continue to give employment to its workers, Winchester Repeating Arms Company, New Haven, Conn., has been placed in voluntary receivership. Application in January to United States District Court Judge Edwin S. Thomas at New Haven resulted in appointment of William A. Tobler, president of the company, and the Union and New Haven Trust Company as receivers. Reports are that the company's cash position is good and that nothing is owed to banks. Interest on debentures became due February 1, however, and on bonds the interest will be due April 1.

No immediate reduction in employes will be made, according to press reports quoting Thomas T. Moran, a director.

Yale and Towne Manufacturing Company

The Yale and Towne Manufacturing Company, Stamford, Conn., announces through its president, Walter C. Allen, that it will transfer two important departments from Stamford to Philadelphia, a part of the builders' hardware business to North Chicago, and the executive offices to New York City. Thereafter the plant at Stamford will be rated as a branch of the corporation. It is one of the largest in the city and employs 4,000 operatives in normal times. The changes are in the interest of economy.

Electric Furnace Patents

In our November issue we published a statement under the caption "Ajax-Wyatt Patents Sustained in Germany," to the effect that an injunction had been issued forbidding the manufacture of induction melting furnaces by Industrie Elektroofen of Cologne, Germany, because of patents held by the Ajax Metal Company of Philadelphia, Pa.

We are informed by the Germany company that this dispute refers to electrode furnaces which they are not manufacturing and that their U. S. patent No. 1,770,662 does not infringe other patents. Consequently, the production of their induction furnaces in the United States can go on.

A communication from the Ajax Metal Company states that they have in their possession a printed decision of the German Court definitely forbidding Industrie Elektroofen to manufacture induction melting furnaces in Germany. No statement was made in the original article concerning the manufacture of induction furnaces in the United States. Although the original note published by us referred only to action in Germany upon a German patent, it is the opinion of the American company that their patents in the United States covering the electric induction field are much stronger than those which they hold in foreign countries.

Gold Plated Door Knobs

Gold plated door knobs will adorn many of the rooms of the new Waldorf-Astoria Hotel being constructed in New York, it was learned recently with the announcement that the order for the manufacture of all of the builders' hardware for the structure had been awarded to the Russell and Erwin division of the American Hardware Corporation, New Britain, Conn.

The order approaches $250,000 and is the largest single order ever given to a factory for hardware of this character. Special designs are being made for the scutcheons, which will be more than twenty inches long.

Brass Ingot Statistics

On January 1st, unfilled orders for brass and bronze ingots and billets on the books of the members of the Non-Ferrous Ingot Metal Institute amounted to a total of 25,015 net tons, according to an announcement of the Institute.

The combined deliveries of brass and bronze ingots and billets by the members of the Institute for the month of December, 1930, amounted to a total of 5,381 tons.

Metal Dirigible Development

The House of Representatives last month voted to retain in the War Department appropriation bill an item of $200,000 to continue research on the development of a metal-clad dirigible. The researches are proposed to be conducted in co-operation with the Aircraft Development Corporation, which is supported by Henry Ford and other private interests.

Metals in Experimental Kitchen

Batten, Barton, Durstine and Osborn, Inc., New York, advertising agents, recently installed in their offices an experimental kitchen where recipes and products could be tried out in order to demonstrate their value. Most of the products used are produced by clients of the agency. Complete modernity has been emphasized in the kitchen, affecting its colors as well as use of various time and labor saving devices. Companies in the metal and allied lines represented by products in this kitchen include Allegheny Steel Company, Armstrong Cork Company, Chase Brass and Copper Company, Inc., E. I. du Pont de Nemours and Company, Inc., General Electric Company, Hamilton-Sangamo Corporation, H. L. Judd Company, Inc., Polar Ware Company, Western Clock Company.

Canadian Bronze Company, Ltd., Montreal, Canada, reports for fiscal year ended December 31, 1930, net income of $308,792 after charges and taxes. This compares with $471,997 in 1929.

Corporation Reports

Savage Arms Corporation and Subsidiaries.—Preliminary statement for 1930: Net profit after depreciation, Federal taxes and other deductions, $339,962, equal after preferred dividends to $1.96 a share on the common stock, compared with $727,075, or $4.36 a share, in 1929.

Federated Metals Corporation and subsidiary.—Year ended Nov. 30: Net loss, after expenses, interest, dividends and $231,038 reserve for depreciation, $676,488, against a net income of $917,836, equal to $3.67 a share on the capital stock in 1929.

Bohn Aluminum and Brass Corporation.—Year ended Dec. 31: Net profit, after charges and Federal taxes, $724,359, equal to $2.05 a share on the capital stock, compared with $2,619,722, or $7.43 a share, in 1929. Sales in 1930 were $14,082 277, compared with $33,243,888 in 1929.

International Nickel Company of Canada declared quarterly dividend of 15 cents on common, placing stock on 60 cents annual basis against $1.00 previously.

Business Reports of The Metal Industry Correspondents

New England States

Waterbury, Connecticut

FEBRUARY 2, 1931.

Gradual improvement in industrial conditions in Waterbury during December is shown in the report of the employment service of the Federal Labor Department. It states that while industrial activity and employment remained below normal, and a surplus of labor existed, a slight increase in employment and production was noted, with some departmental overtime. A particular improvement was noted in the local clock factories.

The local employment relief committee, supported by contributions of employes, business men, individuals and from corporations' treasuries, is now providing work for over 1,700 men weekly and paying out about $18,000 weekly. A slight decrease in the number of men needing work has been noted during January, and there has been a slight increase in the contributions from employes, which are based on a percentage of their weekly incomes. This indicates an increase in industrial employment and weekly earnings.

Acquisition of two concerns making brass products was completed by the **Scovill Manufacturing Company** last month. **O. K. Manufacturing Company** of Oswego was bought for about $65,000. It has been in receivership for about a year. Its former proprietor was **James H. Washburne** who has been in ill health for some time. Its chief item of manufacture is the "O. K." paper fastener, a widely advertised product. It is expected that this product will be manufactured at the plant of the Oakville-American Pin division of the Scovill company here in the future. **Arnold Electric Company** of Racine, Wis., has been purchased by the **Hamilton-Beach Company** of that place, a subsidiary of the local company. It has a line similar to Hamilton-Beach—vibrators, drink mixers and dispensers. Its machinery and equipment will be transferred to Hamilton-Beach. It was capitalized at $100,000 and had about 100 employes. It had several valuable patents.

The equipment and machinery of the **Gilchrist Company** of Newark, N. J., will be transferred to the Oakville-American Pin division here, except the motor manufacturing department, which will be transferred to the Hamilton-Beach plant. Gilchrist makes soda fountain equipment, electric drink mixers, straw dispensers, ice cream dishes, glass holders, shakers, cone dispensers and holders, crushed fruit and punch ladles, teaspoons, ice picks, lemon squeezers and electric hot cups. Hamilton-Beach makes small motors, electric sewing machine motors, vacuum cleaners, vibrators, hair dryers and other electrical household appliances.

Reports show that most of the metal industries in the state paid less dividends in 1930 than in 1929. The total for the state is $3,986,136, a decrease of about $2,000,000 from the previous year. **Scovill** paid but 75 and 50 cents per quarter, compared to $1 a quarter and one extra. American Hardware of New Britain paid an extra of 4 per cent in 1929 and none last year. **Landers, Frary and Clark** of New Britain paid an extra of 4 per cent in 1929 and none last year but increased its quarterly dividend from 3 to 4 per cent. **Torrington Company** in 1929 paid an extra of 2 per cent and this year one of but 1 per cent. **International Silver Company,** Meriden, paid $1 per share this year compared to $1.50 last year.

Local industrial leaders look for better business this year. **John H. Goss,** vice-president of the Scovill Company, says: "I am an optimist by nature. This country is not going to the dogs by any means, and we have been through too many periods of depression to be permanently affected. It is but a question of time as to when we will recover. Speaking for Scovill's, we hit bottom two months ago and I think we are now on the upward trend."

Rodney Chase, advertising manager of the **Chase Companies, Inc.,** says: 'We see no reason to think that business won't be better in 1931 than it was the past year. The increase will come very slowly but it will be discernible." **John A. Coe,** president of the **American Brass Company,** said: "Conditions have been going on so long that your guess is as good as mine."

Congressman Edward W. Goss, connected with the Scovill company, last month persuaded the House to amend the War Department's appropriation bill so as to restrict purchases for use in this country to domestically produced materials. This will particularly affect the brass and metal industries, as it applies to uniform buttons, buckles, pins and other metal products. Hitherto, the department has been forced to let such contracts to the lowest bidder, and this has frequently resulted in letting the contract to brokers and importers who supply foreign merchandise.

American Brass Company, the **Chase Companies** and the **Scovill Manufacturing Company** are experimenting with some new rolling mills, known as the four-high mill and the Steckel mill, it is understood. These mills are said to shorten considerably the rolling and annealing operations, requiring less annealing and less labor at the rolls. while doing more uniform rolling.

Suit for $3,000 has been brought by the **United States Fastener Company** against **John Draher, George Pullen, Max Kiessling** and others as the result of its purchase of the **Waterbury Fastener Company.** It is claimed the local men misstated the liabilities of the concern, and that they were $2,441 more than was set up when the purchase was made. The purchase agreement provided for the purchaser to pay the debts.

Miss Edith Kingsbury, who died recently, was one of the principal holders of Scovill stock. She was a sister of the late F. J. Kingsbury, Jr., former president of the **Bridgeport Brass Company,** and a daughter of F. J. Kingsbury, Sr., a former president of Scovill. The inventory of her estate, filed last month, shows that she held 15,015 shares of Scovill stock, valued at $625,000.

Patents granted local men during the month included: **George A. King,** pin fastener, assigned to Scovill; **Henry Wild and P. A. Reutter,** cosmetic holder, assigned to **Scovill; Paul Fenton,** mounting containers in boxes, assigned to Scovill; **Lincoln Thompson,** electromagnetic pickup device, assigned to the Bristol Company; **George Boden,** locking device for window screens, assigned to **Scovill; Leonard R. Carley,** two patents for fastener and fastener attachment, assigned to Patent Button Company; **John McAtree,** catch means for vanity case, assigned to **Scovill; Adolph Recker,** assignor to Chase Companies, automatic valve; **John J. Crain,** driving mechanism for rotary drilling, assigned to the Waterbury Tool Company; **Charles Kuchauskas,** spring door closer.

W. R. B.

Connecticut Notes

FEBRUARY 2, 1931.

NEW BRITAIN—Stanley Works has filed a petition with the legislature for amendment of its charter permitting purchase of stock by the company for the benefit of its employes up to 10 per cent. This will permit the purchase of 35,000 shares. The floating supply is said to be less than 10,000 shares and this announcement sent the stock up a few points.

The Stanley Works is experimenting with a new product, a device for opening doors worked by light rays. It has been successful in operating swinging doors and it is hoped to perfect it for garage doors.

Salaries of officials and employes of the **North & Judd Mfg. Co.** have been cut 10 per cent to correspond with the reduction in wages of the non-salaried men.

The New Britain-Gridley Machine Co. was closed for two and one-half weeks beginning Jan. 1.

Local patents granted last month included: **E. S. Howe,** assignor to the **Stanley Works,** ornamenting strip metal; **Norman Hurd,** assignor to the **American Hardware Corp.,** lock; **John W. Smith,** assignor to the **Fafnir Bearing Co.,** spring-end connection.

BRIDGEPORT—Bridgeport Metal Goods Mfg. Co. has plans for the erection of a one-story factory building, 60 x 100 feet.

The Lindstrom Tool & Toy Co. plans to build a two-story factory building, 41 by 150 feet.

Harvey Hubbell, Inc., of Bridgeport is undergoing reorganization. Charles S. Hook and Horace B. Merwin of the City Trust Co. have been added to the board of directors; **Charles E. Volkardt** of Utica, N. Y., has been made factory manager and **Frederick W. Massle** of New Rochelle, N. Y., has been appointed comptroller.

President E. P. Bullard of the **Bullard Machine Co.** has sent the stockholders a letter stating that the plant is operating at 63 per cent of normal. While during 1930 it suffered with other industries it was not to the extent experienced by other machine tool concerns due to the fact that it specialized in cost-reducing, productive equipment. The last month the company has averaged 88 per cent of the normal shipments and orders on the books will continue this throughout the quarter.

HARTFORD—Adrian P. Sloan, 84, has completed 50 continuous years with the Cushman Chuck Co. He has been superintendent, treasurer and president, and is now chairman of the board of directors.

L. W. Stevens, factory superintendent of the local plant of **Veeder-Root, Inc.,** has been made general superintendent in charge of all manufacturing in all plants. **H. L. Spaunburg,** factory manager of the Bristol plant, has been appointed chief engineer of the company.

Arthur H. Deute, vice-president and general manager of the **Billings & Spencer Co.,** has resigned and will become a member of the firm of **Hamman-Lesan Co.** of Los Angeles.

BRISTOL—E. E. Ingraham Clock Co. announced last month a new line of $5 wrist watches in an elongated form. The company expects to add electric clocks to its line in the near future.

J. E. Andrews, president of the **Wallace Barnes Co.,** states the company's orders indicate a gradual upswing in business. The increased volume, while not enough to put the concern back into full time operation, has definitely stopped the downward swing and shown an upward tendency as compared with September. .

NEW HAVEN—Winchester Repeating Arms Co., one of the oldest ordnance manufacturing firms in the country, has been put into a receivership by order of Federal Judge E. S. Thomas on application of T. A. D. Jones & Co., coal operators. The company has admitted the allegations in the bill of complaint. **William Tobler,** president and general manager of the company, and the Union and New Haven Trust Co. have been named receivers. The company is solvent, it is said, but its current operations have become embarrassed because of heavy interest and other charges coming due soon and the difficulties of borrowing at the present time. Assets are set at $41,561,831 and liabilities at $37,815,638.

New Haven Clock Company shipments in November were the largest of any November total for four years, President Richard H. Whitehead states.

STAMFORD—Two important departments of **Yale** and **Towne Mfg. Co.** will be transferred to Philadelphia because of the "rapidly rising taxation in Stamford," President Walter C. Allen announces. This transfer will involve about $1,000,000 in property. The builders hardware business will be transferred to North Chicago and the executive offices to New York, also. Under normal conditions this would mean a drop in the number of employes amounting to 300. Hereafter, the Stamford plant will be but a branch of the corporation.

WINSTED—Salesmen of the William L. Gilbert Clock Co. were here for a three-day meeting and annual conference last month. **Vice-President Norman L. Stevens** announced that several new men will be added to the sales force during 1931. He predicted a big improvement during the coming year. There has been no decrease in the number of employes at the plant during the past year he said.

Norman F. Thompson received a patent last month on a clock case and assigned it to the **Gilbert Clock Company.**

MERIDEN—Manning, Bowman & Co. directors passed the January dividend on Class A and B stocks for the purpose of conserving the assets. "Conditions look brighter for 1931 and it is the belief of the directors that dividend payments will be resumed in the near future," the statement reads.

Leroy C. Doane received a patent on a lamp socket last month and assigned it to the **Miller Company.**

TERRYVILLE—Eagle Lock Co. directors voted the regular quarterly dividend of 75 cents a share, payable Jan. 1.

THOMASTON—Most of the married men employes of the **Seth Thomas Clock Co.** have been put on a 50-hour week compared to 40 hours a week previously worked.

W. R. B.

Providence, Rhode Island

FEBRUARY 2, 1931.

While the metal trades of this city and vicinity have suffered from the general depression along with practically every other industry during the year 1930, the opening month of the new year has been attended by conditions that have caused a better feeling for early improvement than has been noted in several months. The building trades, in which there are numerous large local contracts, promise to keep things moving, but the jewelry branches, which were unusually hard hit the past year, are slow to show signs of recuperation.

James V. Callahan, formerly for seven years foreman in the **Liberty Tool and Gauge Works,** Woonsocket, has been appointed foreman of the tool department and assistant superintendent of the **Lincoln Machine Company's** plant at Pawtucket.

J. A. Knasin, for the past seventeen years identified with the sheet metal jobbing business, has announced the opening of a warehouse at 193 South Main street, by the **Richmond Sheet Metal Supply Company, Inc.,** of which he is the president. He

states that a complete line of quality sheet metal will be carried.

The Beacon Manufacturing Company of Providence has been incorporated to manufacture metal novelties; capital stock, 100 shares of common, no par value. Incorporators are **Donald T. McCall, Ora Miner** and **Adolph Gorman.**

Sam B. Sogligian has filed information with the city clerk's office that he is the sole owner of **Narragansett Plating Company,** 162 Chestnut Street, Providence.

George M. Slocum Company has been incorporated to manufacture pens and pencils at Providence; capital stock, 100 shares common, no par value. Incorporators are **George M. Slocum, Henry B. Wright** and **Charles W. Littlefield.**

H. J. Astle and Company report that they have recently completed several large contracts for their blower, exhaust and other machinery in plants at San Antonio, Texas; Newark, N. J., and New York City, and also have quite a number of large installations under way.

Creditors of **Fischer and Preufer, Inc.,** manufacturing jewelers, 144 Pine Street, which has been in receivership, will receive a dividend of about 65 per cent, according to the report of **Calvert E. Casey,** receiver. Dividend has been allowed by the Superior court.

Foster Jewelry Company, Inc., has removed from 158 Pine Street to larger quarters at 36 Garnet Street.

Arthur O. Haenelt, Inc., has been incorporated under the laws of Rhode Island to conduct a jewelry business in Providence; authorized capital, 600 shares common, no par value. Incorporators are **Arthur O. Haenelt,** Cranston; **Vincent L. McMahon** and **Francis W. Conlan,** Providence.

An involuntary petition in bankruptcy was filed the past month in the United States District Court for Rhode Island at Providence, against **Thomas U. Catlow,** manufacturing jeweler of Cranston. The petitioning creditors and the amount of their several claims were as follows: **John F. Allen and Sons,** $500; **American Jewelry Company,** $150; **Fulford Manufacturing Company,** $67.

Michael Nardozzo, 15 Belmont Avenue, East Providence, has filed a statement at the city clerk's office, Providence, that he is the sole owner of the **Independent Sheet Metal Works,** 328 Williams Street, Providence.

The Rothwell-Smith Brass Foundry, 360 North Main Street, Pawtucket, is owned and conducted by **James Rothwell,** 37 Littlefield Street, Pawtucket.

Ira Marcus, Providence attorney, has been appointed receiver, under bond of $10,000, for **Berren's, Inc.,** operating retail jewelry stores at 131 and 197 Weybosset Street.

Almyr L. Newman, widely known as an inventor and manufacturer of jewelers' tools, died December 25, 1930, at his home on Fair Street, Lakewood, a suburb of Providence. He was ill four months. Mr. Newman was born in Lakewood in 1871 and, with the exception of a few years in Newark, N. J., had always resided in Lakewood. He had been engaged for several years in the manufacture of jewelers' tools at Pawtucket, under the firm name of **A. L. Newman and Son.**

The Manufacturers' Supply Company, Inc., has been incorporated under the laws of Rhode Island to deal in jewelers' supplies; capital, 100 shares common, no par value. Incorporators are **Artocky Berberian, Frank H. Fairbrother** and **Aram A. Arabian.**

Anthony C. Paolino has registered at the office of the City Clerk that he is the owner of the **Empire Enameling Company,** 185 Eddy Street.

Welsh Manufacturing Company has increased its capital stock from $25,000 and 1,000 shares no par common stock to $35,000 and 1,000 shares no par common stock.

General Plating Company, 224 Eddy Street, Providence, is owned and conducted by **Hajop Joljorian,** 298 Narragansett Avenue, Cranston, according to his statement on file at the city clerk's office. W. H. M.

Middle Atlantic States

Central New York

FEBRUARY 2, 1931.

From Rome, the central point of the brass and copper industry in Northern and Central New York, comes reports this month that the non-ferrous metal industries there are no longer on the down grade. For many months the statistics given out by these firms have shown a gradual clipping of pay rolls and shrinking of business. But this month, according to the Industrial Association of Utica, very little if any recession of business has been indicated. Manufacturers in this area regard the fact that the copper and brass industries are marking time instead of going backward as encouraging to a degree.

It is announced that commencing February 2, when the **Oneida Community, Limited,** starts up again, it will be on four-day week basis. The employes recently have been working only one and two days a week. This is the first upward trend of business noted in the immediate Sherrill and Oneida section.

Line Hardware Company of Wisconsin will start moving in the old Dodge manufacturing plant within a few days, making Oneida, N. Y., the distributing point for eastern United States for the electrical supplies the company handles.

Pierrepont B. Noyes, head of the Oneida Community, Ltd., has been appointed by Governor Roosevelt chairman of the Saratoga Springs Commission.

An increase of 10 per cent in the employment this month at the **Bossert Corporation** in Utica is expected, according to **Francis K. Kernan,** president. Mr. Kernan said the corporation has been employing 250 men. The increase, he said, will be over December. Because of the added work in some departments it has been necessary to put on a small night gang.

From Ilion comes the news that only a small decrease in the earnings of Remington Arms will be noted for 1930. It was learned there that the net earnings for 1930 will probably be about 10 per cent below 1929, which were $1,585,571. Officials announced that Remington, in spite of the smaller sales and generally poor business conditions, has maintained its force of employes and its wage scales.

In Frankfort plans are on foot to establish a new industry which will employ from 75 to 100 men. The new firm will be allied with the **Union Fork and Hoe Company,** and will be launched through the efforts of **Edward Durrell** of that company. The new firm will make shovels, scoops, spades and other articles. E. K. B.

Newark, New Jersey

FEBRUARY 2, 1931.

National Lock Washer Company, which has a plant covering a square block at Newark, has built a large addition for future needs, despite the depression. **Cyrus H. Loutrel,** president, said the four-story structure was built to provide work for the unemployed and to effect better working conditions. The company was founded in Milwaukee, Wis., in 1866, to manufacture a distinct type of lock washer invented by **Heyward Harvey.**

Involuntary petition in bankruptcy has been filed in the Federal Court by **Lewis C. Freund** against the **Marvin Radio Tube Corporation,** 70 Coit Street, Irvington. **Harry G. Hendricks** and **Purvis D. Jackson** were recently appointed chancery receivers. Court denied the application of Freund to have a federal receiver appointed. He said he did not want to appoint more receivers, as it would double the cost.

Fees totaling $50,000 have been awarded to receivers for **Kolster Radio Corporation.** The receivers, **Harry C. Hendricks** and **Harry Meyers,** of Passaic, and **Ellery W. Stone,** former president of the company, were given $10,000 each, and the remainder went to lawyers. The court has an offer from New York brokers to purchase the company as a going concern. The receivers reported collections of $2,083,334, disbursements of $1,885,000, and a balance of $198,125.

Sidney Silver, attorney, has been appointed receiver for the **Majestic Electrical Manufacturing Corporation.** The concern manufactured radio tubes at 227 High Street. The receiver

was appointed upon application of a Rhode Island concern which charges insolvency. The plant was recently shut down. The concern was incorporated March 9, 1929.

The following Newark concerns have been incorporated: **Unsinger Cutlery Company;** manufacture cutlery; $100,000. **Bliss-Scofield Corporation;** manufacture jewelry; 2,000 shares common. **Forest Hill Foundry Company;** $100,000. **Sloan and Chase Manufacturing Company;** manufacture tools; $50,000. **Ter-Ter Chemical Service, Inc.;** chemicals; 100 shares no par. **Harris Wire Corporation;** manufacture wire; $100,000 preferred and $5,000 common. C. A. L.

Trenton, New Jersey

FEBRUARY 2, 1931.

Final accounting of the estate of the late **Ferdinand W. Roebling, Sr.,** former president of the **John A. Roebling's Sons Company,** shows that over $6,500,000 was distributed to beneficiaries. A balance of $20,989 remains on hand to cover any further claims that might be presented.

An excess of $20,533 in the income tax of John A. Roebling's Sons Company has been announced by the Treasury Department. The sum of $20,533 was credited and $6,294 was refunded. The excess was due to additional reductions for ordinary business expenses discovered after investigation.

Brunswick Engineering Company, Inc., has purchased the assets of the **C. & H. Manufacturing Company,** New Brunswick, N. J.; the **Apex Manufacturing Company,** Freeland, Pa.; part of the machinery and equipment of the **J. & G. Brass Company,** New Brunswick. The new firm will be located at the latter place, and will manufacture solderless storage battery terminals, gauges and replacement parts.

The following concerns have been chartered at Trenton: **King Jewelry Company,** to manufacture jewelry; $125,000; Camden. **Interstate Chemical Company;** chemicals; $50,000 preferred and 1,500 shares common. **Chemical Manufacturing Company of New Jersey,** chemicals; 2,500 shares; Hawthorne. **Marion Electrical Manufacturing Company,** electrical supplies; 2,500 shares; Jersey City. **Chris Muentener Company,** electrical devices; 1,000 shares common; Carlstadt. **Tungsten Contact Manufacturing Company, Inc.,** electrical appliances; $100,000 preferred and 2,000 shares common; North Bergen. C. A. L.

Middle Western States

Detroit, Michigan

FEBRUARY 2, 1931.

Conditions in the non-ferrous metal industry have been improving since the first of the year. The improvement has been slow, but it is a source of encouragement and has had a good effect on other lines of industry. Just how long it will continue remains to be seen.

As in other years, the motor car industry is principally responsible for improvement at this season. Most of the great plants are now in production again. Not all of them are operating full time, but it looks as if they would reach that point before very long. Accessory plants also are getting back into production.

The plating industry, which has suffered severely for many months, is gradually gaining. The weeks to come will probably show much improvement in this field.

Although industrial conditions all through this area are better, this does not mean a surplus of jobs for the unemployed. Former employes are given preference. Outside labor is not in favor in Detroit at present, nor is the immediate future particularly bright for it.

Grand River Plating and Manufacturing Company, 4144 Grand River Avenue, was recently incorporated. The capital stock is $12,000. It is engaged in a general plating and polishing business. Incorporators are **Vincent B. Arnold, Henry E. Adelsperger, Jr.,** and **Glenn Freidt.**

Aircraft Development Corporation, a unit of the **Detroit Aircraft Corporation,** is actively planning for the construction of a metal-clad airship for the United States Army. It probably will be modeled after the small metal-clad craft built by the same concern for the navy in 1929, it is stated, but may be four times as large and possibly approximate the size of the "Graf Zeppelin." Cost of the proposed ship is estimated at $4,500,000. It will be entirely of metal, the largest ever undertaken with this type of construction.

Forecast of a steady increase in automobile production in 1931, a better year for parts producers, featured a report recently released by **Charles B. Bohn,** president of the **Bohn Aluminum and Brass Company,** Detroit. With only a moderate increase in schedules, he looks for a steady increase in the production of motor cars as the new year advances. "It is conservative to expect the 1931 output to reach 4,000,000 cars," he says. "Parts producers should enjoy a better business in 1931 than the motor car manufacturers. Not only will they have to supply parts for a larger production of cars this year, but they also will have to build up normal inventories of parts for car manufacturers who are now down to bedrock. Operations of the Bohn company reached a low point in November. There was a ten per cent pickup in December; January should show a gain of 15% over December. We are operating four days a week, as against three days a week in December, and employment this month will show a gain of about 500 over the November low point."

The foundry of the **Chevrolet Motor Car Company** at Saginaw reports about the same number of orders ahead as at this time a year ago. Prospects for the first and second quarters of the new year are considered fair. During this period the company will be in the market for lead, aluminum and other supplies. It is now employing 2,600 persons as compared with 3,600 in January, 1930.

Moynihan and DuChane Company, Detroit, fabricators of artistic wrought brass, report they felt no business slump during 1930. The company has had a capacity business, and the outlook is good, according to a recent announcement.

Detroit Torch and Manufacturing Company expects sales during the first half of 1931 to equal about 75% of its 1930 business. Orders ahead equal about 60% of those reported a year ago. Fifteen persons are on the payroll now, compared with 35 a year ago.

Parker Rust Proof Company reports orders on hand about equal to those of a year ago, and that the outlook is fair. The company is now employing 85 persons, compared with 150 a year ago, it is stated.

Crittall Casement Window Company reports it is anticipating an improvement in business during the first quarter and probably still better business during the next quarter. Orders, compared with a year ago, are reported only 5% off. This company, it is stated, will be in the market for brass castings and other supplies.

Consolidated Brass Company is reported to have only 20% less orders than a year ago, with fair prospects for the first half of 1931. The payroll now stands at 51, as compared with 60 a year ago. Non-ferrous metals constitute the company's material requirements.

Nicro Plating Company, 5060 Townsend Avenue, has been incorporated with capital stock of $10,000. This concern is engaged in a general plating business. The owners are **Ben Shwayder, Burton Clamage** and **Paul Narienthal.**

Fred L. Riggin, secretary, **Mueller Brass Company,** Port Huron, announces organization of a subsidiary to handle sales of the new steam line copper pipe fitting invented by **Charles A. Hill,** a Mueller engineer. The new concern is known as the **Mueller Steam Line Copper Pipe and Fittings Corporation;** it is wholly owned by Mueller Brass.

Michigan Valve and Foundry Company, Detroit, reports fair business prospects for the first half of the year. Company will be in the market for brass, copper and non-ferrous scrap; 240 persons are now employed, as compared with 280 in January, 1930.

Prescott Company, Menominee, Mich., manufacturer of sawmill, pumping and transmission machinery, reports 100% more orders ahead than a year ago, with prospects fair for new

business through the first six months of the present year. The company will be in the market for copper ingots and other supplies. It is now employing 205 persons, an increase of 29 as compared with January a year ago.

Bay City Shovels, Inc., Bay City, Mich., reports about the same number of orders ahead as a year ago. During the coming six months it does not look for much, if any, increase in new business over the same period of 1930. Company will be in the market for aluminum and brass castings. Employes number 184, as compared with 182 a year ago.

Gale Manufacturing Company, Albion, Mich., reports prospects for new business during the coming six months as somewhat uncertain, but is expecting much better conditions during the final half of the year. During the first two quarters the company will be in the market for aluminum and other supplies. It is now employing 205 persons, as against 265 in January, 1930.

H. B. Sherman Manufacturing Company, Battle Creek, brass foundry, believes that business has scraped the bottom and any change will be for the better. It is now employing 160, as compared with 190 in January last year.

Novo Engine Company, Lansing, reports that while December is ordinarily the slack period, orders ahead at present are approximately the same as a year ago. Prospects for new business during the first quarter are considered fair, but a decided increase is expected during the second quarter. During the next six months the company will be in the market for lead, brass, aluminum and other supplies.

Kawneer Company, Niles, Mich., believes that prospects for the first six months of the new year are better than they were during the same period of 1930, but may not measure up to the first two quarters of 1929. The company will be in the market for brass, aluminum, copper and other supplies.

F. J. H.

Cleveland, Ohio

FEBRUARY 2, 1931.

Production in the metal industry in this area shows increases over the low of December. Although it is not as pronounced as might be desired, it is sufficient to indicate that better things are in sight. This is particularly true of the automobile parts lines.

The effects of the motor car shows at New York, Detroit and other cities already are being felt. Buying is decidedly on the increase and the big plants in the Great Lakes area are increasing production from day to day. Most of the parts manufacturers are in fair production and will be doing better as the season advances.

The plating industry, naturally, improves with the motor car activities. Conditions in this line are decidedly on the upward trend.

Manufacturing in lines not closely allied with the motor car industry is still slow in picking up. But there is reason to expect an early change for the better. The next thirty or sixty days should find practically every line of industry feeling the effects of early spring activities. F. J. H.

Wisconsin Notes

FEBRUARY 2, 1931.

A new industry recently made its appearance in Milwaukee when the **Milwaukee Stamping Company** bought out the **Litterer Brothers Manufacturing Company,** Chicago, and moved it to West Allis. The expansion has made Milwaukee a leading center in the manufacture of metal toilet partitions and shower stalls. The company is one of the leading producers of luggage hardware, spring hinges and garment fixtures, and does business in metal stampings of various kinds. It has a plant with more than three and one-half acres of floor space, employs about 500, and has 100 sales representatives throughout the United States.

Iroquois Foundry Company has been opened in Racine by **R. L. Niesse, August Zierthaler** and **John Jurax,** to engage in general jobbing, working in nickel. Besides doing business in Racine, the foundry company has trade outlets in Milwaukee and Kenosha.

That production on booked orders may be accelerated, work on an addition to the plant of the **I. J. D. Metal Products Company, Inc.,** at South Milwaukee, is being rushed, according to **N. C. Dudley,** vice-president and general manager. The concern manufactures automobile specialties, does general stamping work, and fabricates brass, copper, Alleghany and other metals. Although organized late in October, 1930, orders have been received in sufficient volume to warrant a capital stock increase of $35,000, consisting of 70 per cent in $100 common shares and 30 per cent in 7 per cent cumulative preferred. When organized, the firm issued $15,000 of paid-up stock. The company is utilizing 6,000 square feet of floor space; the additional unit will provide 8,000 square feet more. Other officers, in addition to Mr. Dudley, are **Joseph R. Wnuk,** president, and **I. A. Wnuk,** secretary-treasurer. A. P. N.

Other Countries

Birmingham, England

JANUARY 19, 1931.

The composite exhibit of British silver work which is being sent to the **British Empire Trade Exhibition** at Buenos Ayres in March has been on view at the Goldsmiths' Hall, London, recently. The work of numbers of jewelers and silversmiths in Birmingham and Sheffield in exquisite silver and silver gilt plate is some of the best of its kind produced in the industry at the present time. Many interesting models will be seen, including the old "Mayflower", the Golden Arrow car, and the speed boat on its way across a miniature ocean.

Orders for brass tubes are to be given out with Midland firms in connection with the construction of the **Cunard Line's** giant liner about to be built. It is also expected that the interior fittings in various non-ferrous metals will also be made in Birmingham. A number of firms are well equipped for handling this class of work, although the plant has been idle lately, owing to the scarcity of shipbuilding contracts in the north of England and on the Clyde.

Taking the non-ferrous industries as a whole, 1931 found the position less satisfactory than at any time in the previous twelve months. The price of copper continued to fall, and as a result consumers have held off the market except for the very smallest quantities of material.

The brassfounders of the Birmingham district are divided into many categories, but in practically all of them demand is poor. In the latter half of 1930 the depression in the building industry caused a slackening of demand for plumbers' ware and cabinet materials. The British manufacturers of cabinet brass-foundry are still having a keen fight against Continental competition in the cheaper qualities, as some German firms are putting materials onto the British market at ridiculously low prices. The use of chromium plating has become more widespread throughout the past twelve months and as a finish has taken the place of brass, owing to the demand for labor saving under modern conditions. The stampers and casters, however, have, of course, benefited by the steady demand for the brass fittings and parts needed for plating.

The jewelry trade has improved its position in the year just ended, and in some departments there has been a steady demand especially for wedding rings. The export trade in electroplate has suffered as the result of political unrest in some of the main markets, especially in the East, where electroplating is very popular, owing to its suitability for warm dry climates. The tariff walls erected by the United States have prevented any expansion in British exports of silver and electroplate. Australia has put an embargo upon such goods with the luxury tax, but New Zealand is still a fair market. The Birmingham jewelry and allied trade will have a composite exhibit at the Olympia section of the British Industries Fair, to be held from February 16 to 27.

New arrangements in regard to brass workers' wages came into force on January 10 under an agreement of the **Joint Conciliation Board,** comprising the Brassfounders' Employers' Association and the National Brass and Steel Mechanics' Society.

The reduction of 2½ per cent on January 10 will be followed by a similar reduction to take effect on wages paid on the pay day of the week ending April 25, 1931. This applies to both day workers and pieceworkers, and the reductions will be made from the total amount earned. The arrangement applies to full-graded men. In the cases of youths or those below full grade, half the reduction will apply.

At the end of December another reduction of ¼d. a pound took place in brass and copper tubes, following a fall earlier in the month. The uncertainty in the copper market is having a depressing effect upon the tube trade, and consumers have not been sufficiently interested to follow these reductions with any substantial increase in contracts. J. A. H.

Business Items—Verified

Wilson-Cromwell Plating Company, 138 North Mechanic Street, Cumberland, Md., has opened a complete plating plant.

The Engineering-Economics Foundation, formerly at 3 Joy Street, Boston, Mass., announces its removal to 711 Boylston Street, Boston.

J. D. Kilgore Metal Products Company, Newcomerstown, Ohio, has resumed operations. This firm operates the following departments: plating, grinding room.

The Stanley Works, New Britain, Conn., have purchased the building at 100 Lafayette Street, New York, where their New York office and warehouse stocks are located.

Yoder Company, 5500 Walworth Avenue, Cleveland, Ohio, manufacturer of special machinery and parts, is completing plans for a one and two-story addition to cost over $150,000 with equipment.

Niagara Brass Works, 2615 Orchard Street, Niagara Falls, Ont., Can., recently began operations. **E. Lawson** is owner and manager. The following departments are operated: brass, bronze, and aluminum foundry.

Michigan Copper and Brass Company Division of Revere Copper and Brass Incorporated is now operated as the **Revere Copper and Brass Incorporated,** Michigan Division, 5851 West Jefferson Avenue, Detroit, Mich.

Fellows Brass and Iron Foundry, Fellsway and Myrtle Streets, Medford, Mass., has been acquired by **L. S. Smith** and **W. F. Corson.** This firm operates the following departments: brass, bronze and aluminum foundry.

A factory branch office of the **Duriron Company,** Dayton, Ohio, was opened February 1st at 7-252 General Motors Building, Detroit. **Richard R. Rourke,** former sales engineer out of the general office, has been appointed manager.

Aluminum Industries, Inc., Cincinnati, Ohio, announces that all of its products and those manufactured at its Diamond division at St. Cloud, Minn., will henceforth carry the trade mark "Permite," which has been adopted as standard instead of "Permite-Diamond," formerly used.

Coulter Manufacturing Company, 115 Sumach Street, Toronto, Can., is receiving tenders for a one-story factory, 150 x 160 ft. at Oshawa. This firm is a subsidiary of **Coulter Copper and Brass Company.** The following departments are operated: tool room, stamping, plating, polishing, lacquering.

A. A. Clarke, Muskegon, Mich., and associates have incorporated as **A. A. Clarke Company,** with capital of $250,000, to continue operation of a factory for the production of vacuum cleaners and kindred electrical appliances. **T. B. Bennett** is an official of the company, which has been in business for several months.

Thomas Radiator Manufacturing Company, 627 Broadway, Fresno, Cal., plan to enter the electroplating field in connection with their business of producing automotive cooling systems. Chromium and nickel plating units will be installed first. The company desires information on installation of proper equipment. **John Avakian** heads the concern.

Bartley Crucible and Refractories Company, Trenton, N. J., advises that **William MacFadden,** formerly vice-president of the **Chicago Naugatuck Crucible Company,** has joined its organization. Mr. MacFadden, who will serve in general executive capacity, will be located at the general offices of the company in Trenton.

Heil Company, 3000 West Montana Street, Milwaukee, Wis., is transferring entire operation of **Milwaukee Air Power Pump Company,** and **Combustion Fuel Oil Burner Company,** acquired some time ago, to its own plant and will lease or sell pump and burner shops at 8-10 Keefe Avenue. **Julius P Heil** is president. This firm operates the following departments: tool room, cutting-up shop.

The Lester Die and Machine Company, 2810 Superior Avenue, Cleveland, Ohio, has been organized for the manufacture of dies, die casting machines, and die casting engineering, by **N. Lester,** formerly connected with the **P. and R. Tool Company,** Worcester, Mass., and more recently with the **Precision Castings Company,** Syracuse. Incorporators and directors are **N. Lester, William Lester** and **F. W. McIntyre.**

Washerless Valve Company, 136 Freelon Street, San Francisco, Cal., recently began production of a new type of Everdur and Monel metal valve, requiring no washers, for use on flushometers and other purposes. Company also makes ballcocks and tank-trough valves. Products are distributed nationally from the San Francisco headquarters. Charles Camp is general manager. Company operates brass machine shop, tool room, stamping, brazing and polishing departments.

Diamond Silver Company, recently organized by interests connected with Mitten Men and Management Bank and Trust Company, Market Street, Philadelphia, Pa., has acquired at receiver's sale, plant and property of **Hobson Flatware Company,** Lambertville, N. J., manufacturer of plated goods. The new owner plans improvements, including installation of additional equipment. This firm operates the following departments: tool room, stamping, plating, polishing, grinding room.

Illinois Zinc Company, Peru, Ill., has started operations at its new extruded metals department, which was added to the plant as a result of the purchase of the manufacturing rights and equipment of the **Extruded Metals Corporation,** subsidiary of **E. W. Bliss Company,** Brooklyn, N. Y., some months ago. The equipment of that company was shipped to Peru and set up in a section of the Illinois Zinc plant formerly devoted to rolling. **Charles MacBrayne** is in charge of operations of the new department.

Illinois Testing Laboratories, Inc., 141 West Austin Avenue, Chicago, Ill., announces through its sales manager, **M. D. Pugh,** the appointment of **James H. Knapp Company,** 4920 Loma Vista Avenue, Los Angeles, Calif., with a branch in San Francisco, as exclusive Pacific Coast distributor of its products for industrial purposes, consisting of "Alnor" and "Price" portable and stationary indicating pyrometers, resistance thermometers and other electrical and magnetic measuring instruments.

Moto-Meter Gauge and Equipment Corporation, Toledo, Ohio, manufacturer of automotive equipment gages, etc., is planning expansion and will install additional equipment. Similar work will be carried out at branch plant at La Crosse, Wis. The entire project will cover over $100,000. The company recently acquired a new fuel-saving device, invented by **Dr. Miller Reese Hutchinson,** and will arrange facilities for production. Expansion of midwestern plants is due mainly to removal of Long Island City, N. Y., activities to those plants, according to **C. M. Adams,** vice-president and general manager.

Correction

The previous issue should have stated that **Lewis** Roe, Brooklyn, N. Y., had changed the name of his firm to **Lewis Roe Manufacturing Company,** effective January 1, 1931, and not 1930, as misprinted.

Review of the Wrought Metal Business

By J. J. WHITEHEAD

President of the Whitehead Metal Products Company of New York, Inc.

FEBRUARY 1, 1931.

The outstanding event of the past month has been the change in sentiment from deep gloom to one of hopefulness. In December banking difficulties were acute and every one was about as pessimistic as they possibly could be. With the turn of the year, however, the deep gloom was dispelled and at this writing things look much better. This does not mean that the sky is all clear, however. Probably there are still certain situations that must be straightened out.

The month for copper has been quiet. Domestic shipments were moderate but several flurries took place due to export demand.

The mills have noted an improved demand for fabricated copper and copper products, especially from automobile companies. The valve business seems to have improved more than seasonally and this is a very good indication, because valves are used in every industry. Architects have quite a good deal of work on their boards. Federal construction mentioned by Washington should be getting under way pretty soon. Road building and other construction should improve and reduce unemployment as spring approaches.

With any revival of business, no matter how slight, the copper and brass industries will feel the effect. In fact, all metals and industries will share in any kind of a revival. It is not anticipated that a tremendous upturn will occur but that slow, steady improvement will take place. It is expected that this will be well under way by April or May.

With the turn of the year the demand for nickel for inclusion in iron showed an improvement. As in the case of copper and copper alloy products, no revival of tremendous proportions occurred, but an improved demand for nickel and nickel products was noted.

The demand for fabricated Monel products continues. Neither nickel nor Monel have shown a letdown in demand proportionate to that occurring in industry generally. This is attributed to the development campaign of the producers of these materials, which has created new uses for these products that have taken up the slack. When general recovery occurs and we again have "normal" times, it will be found that the normal demand for nickel and Monel will be very much larger than ever before, it is believed.

Aluminum is in constant demand, but the tonnage requirements are smaller. Orders are numerous but the average tonnage of such orders is much reduced as compared to the demands of 1928 or 1929.

It looks as if we were over the worst of the depression,—certainly over the panicky part of it. Our activities will not overnight jump up to the normal line, but if they will turn up and continue to keep going up we will be on the road that leads to recovery, prosperity and safety.

The records of 1930 are now coming before us for examination. They will not be pleasant, but they really are "water over the dam," and evidence that we should resolutely face 1931 and put our shoulders to the wheel.

Metal Market Review

By R. J. HOUSTON

D. Houston and Company, Metal Brokers, New York

COPPER

FEBRUARY, 2, 1931.

Transactions in copper since the beginning of the year were in fair volume, especially for export account, but buying for domestic use was on a conservative scale. For a time the market held comparatively steady at 10½ cents Connecticut Valley delivery, but demand was not of sufficient proportions to maintain that price. The basis of 10 cents was established early in January. There was only a limited amount of buying by local consumers, however, and this is a direct reflection that manufacturers are well covered for several months ahead.

There were two reductions in the export price during the past month. At the lower levels good foreign buying was encountered. A steady demand from abroad at 10.55 cents c.i.f. European ports, and later at 10.30 cents, was an outstanding feature. These prices for export compared with 10.80 cents at beginning of January. The foreign price for March and April shipment was increased on January 16 to 10.35 cents, with January and February remaining at 10.30 cents. The premium was subsequently dropped on first quarter shipments.

Developments in the statistical position showed a substantial decrease in refined output for December. Evidently the curtailment at sources of output is being verified. Some outside copper was reported on market at 9¾ cents at month-end, but principal sellers were quoting 10 cents.

ZINC

There was a notable lack of enthusiasm in the zinc market lately. Caution predominated in consuming circles in spite of prevailing low prices. Market movements were narrow, but recently showed a slight gain owing, possibly, to the comparatively tight ore situation. The ore surplus is substantial, however, but is apparently in strong hands. There was moderate buying from time to time. The market appears to be in position to do better if selling pressure is suspended for a few weeks. Signs of more underlying strength have brought out inquiries from consumers for forward deliveries. Buyers seemed to be more impressed with current price levels. A little more confidence is all that is needed to start large sized buying. Important transactions are therefore likely in near future. The market closed firm at 4.05 cents East St. Louis.

TIN

The past month brought substantial fluctuations in market values for tin, but price movements in this commodity are no longer as outstanding as in former years. Tin prices are now much below the average quotations during the last two decades. It is quite noticeable, therefore, that manipulation, either up or down, is naturally conducted within comparatively narrow limitations. Consumer buying developed in fair volume. There were no tangible signs, however, that there was any widespread desire among buyers to make extraordinary commitments in anticipation of future requirements.

Consumers and dealers have been greatly interested in the scheme for the curtailment of output and the international restriction of exports. The tin producing industry is burdened with large visible supplies and excess output which have depressed prices to levels considered uneconomic and unprofitable. Agreement satisfactory to all factors has been difficult owing to the complex conditions proposed. There have been approvals by some and objections by others. Meanwhile the market is awaiting developments that will give impetus to both consumption and prices.

LEAD

Large scale buying of lead occurred last month on declining prices which induced consumers to cover both nearby and future requirements by good-sized purchases. There were three price reductions during the first ten days of January. This led important interests to abandon their hesitation, being impressed particularly by the low range of prices. The present price level is 4.75 cents New York and 4.55 cents East St. Louis. These figures compare with 5.10 cents and 4.95 cents respectively at the beginning of the present year. Cable makers and other industries bought liberally at the more attractive offers, but the market activity was not sufficient to bring about any price upturn. There was an increase of 12,845 tons in stocks of lead during December.

ANTIMONY

There was a moderate degree of market activity in antimony recently for both China shipment and local account. Prices held the firmest during the first half of January. Sales were made for spot and future deliveries around the equivalent of 7½ cents duty paid. China offerings were on a little higher basis, but prices were subsequently reduced to 7⅛ cents duty paid. The trend at end of month was easier and buyers showing little interest.

ALUMINUM

Leading producers of aluminum enjoy the distinction of being able to maintain prices for their product without sign of shading, according to current reports. Demand is on a smaller scale than at normal times, but the price movements for the best known grade of the metal remains unchanged. This is a remarkable position for any commodity. Action of the outside market, and that for remelted aluminum, however, respond to state of trade and other developments tending to raise or lower prices. It may be pointed out that even here the trading range is narrow. Consumption is at a fairly good rate, although the demand is considerably below the supply of casting material in the middle western centers of industry.

QUICKSILVER

Inquiry for quicksilver is reported good for small quantities. Demand, however, is not active enough to offset fairly substantial offerings at $103 to $105 per flask. Shading of these quotations were heard of. Imports for 11 months of 1930 were estimated at approximately 208,486 pounds, against 987,776 pounds for same period in 1929.

PLATINUM

Trading in platinum is on a restricted scale. The refined metal quotes $33 to $36 per ounce.

SILVER

Continued weakness in this metal remains an outstanding feature. Present price at this writing quotes 28⅞ cents per ounce, and uncertainty dominates the market. India was quite actively interested as a buyer in January, but prices dropped off again after these orders were filled. China appeared as a rather heavy seller for speculative account. Despite recent low levels there has been no sustained rally.

The position of silver is claiming world-wide attention. Further curtailment of production will probably be necessary to create a more favorable market condition.

OLD METALS

There were recessions in price movements of the copper group due to the sagging tendencies for virgin metal. Demand was moderate, but exporters have taken fair supplies on the more attractive buying basis. In view of current low prices dealers maintain a conservative attitude believing that good rather than bad features should be emphasized. A good demand for new copper at better prices is needed to stimulate activity in the market for secondary material. The market for all scrap supplies falls or rises by fractions according to fluctuations for the primary metals. Brass, lead and the white metals show sluggish movements in light volume. Prices are given on page 101.

Daily Metal Prices for Month of January, 1931

Record of Daily, Highest, Lowest and Average Prices and the Customs Duties

	1*	2	5	6	7	8	9	12	13	14	15	16	19
Copper c/lb. Duty Free													
Lake (Del.)	....	10.625	10.625	10.625	10.625	10.625	10.375	10.375	10.125	10.125	10.125	10.125	10.125
Electrolytic (f.a.s. N. Y.)	....	10.50	10.50	10.50	10.50	10.50	10.25	10.25	10.00	10.00	10.00	10.25	10.25
Casting (f.o.b. ref.)	....	10.25	10.25	10.25	10.25	9.75	9.75	9.75	9.75	9.75	9.75	9.75	9.75
Zinc (f. o. b. St. L.) c/lb. Duty 1¼c/lb.													
Prime Western	....	4.125	4.10	4.10	4.05	4.05	4.05	4.00	4.05	4.05	4.00	4.00	4.00
Brass Special	....	4.225	4.20	4.20	4.15	4.15	4.15	4.10	4.15	4.15	4.10	4.10	4.10
Tin (f. o. b. N. Y.) c/lb. Duty Free													
Straits	....	26.625	26.875	26.625	27.25	26.875	26.375	25.75	25.75	25.70	25.625	26.25	26.00
Pig 99%	....	25.75	26.00	25.75	26.375	26.00	25.50	24.875	24.875	24.80	24.75	25.375	25.125
Lead (f. o. b. St. L.) c/lb. Duty 2¼c/lb.	....	4.95	4.80	4.80	4.65	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.55
Aluminum c/lb. Duty 4c/lb.	....	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30
Nickel c/lb. Duty 3c/lb.													
Ingot	....	35	35	35	35	35	35	35	35	35	35	35	35
Shot	....	36	36	36	36	36	36	36	36	36	36	36	36
Electrolytic	....	35	35	35	35	35	35	35	35	35	35	35	35
Antimony (J. & Ch.) c/lb. Duty 2c/lb.	....	7.20	7.30	7.30	7.375	7.375	7.30	7.50	7.50	7.50	7.50	7.50	7.50
Silver c/oz. Troy Duty Free	....	31.25	29.875	29.50	30.00	28.75	28.50	29.875	30.125	28.75	29.125	28.50	28.875
Platinum $/oz. Troy Duty Free	....	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00

	20	21	22	23	26	27	28	29	30	High	Low	Aver.
Copper c/lb. Duty Free												
Lake (Del.)	10.125	10.125	10.125	10.125	10.125	10.125	10.125	10.125	10.125	10.625	10.125	10.268
Electrolytic (f.a.s. N. Y.)	10.25	10.25	10.25	10.00	10.00	10.00	10.00	10.00	10.00	10.50	10.00	10.202
Casting (f.o.b. ref.)	9.75	9.75	9.75	9.75	9.75	9.50	9.50	9.50	9.50	10.25	9.50	9.798
Zinc (f. o. b. St. L.) c/lb. Duty 1¼c/lb.												
Prime Western	4.00	4.00	4.00	4.00	4.05	4.05	4.05	4.05	4.05	4.125	4.00	4.039
Brass Special	4.10	4.10	4.10	4.10	4.15	4.15	4.15	4.15	4.15	4.225	4.10	4.139
Tin (f. o. b. N. Y.) c/lb. Duty Free												
Straits	25.75	26.375	25.90	26.00	25.75	26.00	25.80	25.50	25.40	27.25	25.40	26.104
Pig 99%	24.875	25.60	25.10	25.20	24.875	25.25	25.10	24.625	24.625	26.375	24.625	25.258
Lead (f. o. b. St. L.) c/lb. Duty 2¼c/lb.	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.55	4.95	4.55	4.598
Aluminum c/lb. Duty 4c/lb.	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30	23.30
Nickel c/lb. Duty 3c/lb.												
Ingot	35	35	35	35	35	35	35	35	35	35	35	35
Shot	36	36	36	36	36	36	36	36	36	36	36	36
Electrolytic	35	35	35	35	35	35	35	35	35	35	35	35
Antimony (J. & Ch.) c/lb. Duty 2c/lb.	7.50	7.50	7.375	7.375	7.25	7.125	7.125	7.125	7.125	7.50	7.125	7.35
Silver c/oz. Troy Duty Free	29.125	30.00	29.375	29.75	29.75	29.25	29.50	28.875	28.75	31.25	28.50	29.405
Platinum $/oz. Troy Duty Free	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00	33.00

*Holiday.

Metal Prices, February 6, 1931

NEW METALS

Copper: Lake, 9.625. Electrolytic, 9.50. Casting, 9.375.
Zinc: Prime Western, 4.05. Brass Special, 4.15.
Tin: Straits, 25.875. Pig, 99%, 25.25.
Lead: 4.30. **Aluminum,** 23.30. **Antimony,** 7.05.
Nickel: Ingot, 35. Shot, 36. Elec., 35. **Pellets,** 40.
Quicksilver: flask, 75 lbs., $104. **Bismuth,** $125.
Cadmium, 70. **Cobalt,** 97%, $2.50. **Silver,** oz., Troy (N. Y.) official price (February 6) 26.50.
Gold: oz., Troy, $20.67. **Platinum,** oz., Troy, $30.00.

INGOT METALS AND ALLOYS

Brass Ingots, Yellow	7½to10
Brass Ingots, Red	9 to12
Bronze Ingots	11 to14
Casting Aluminum Alloys	21 to24
Manganese Bronze Castings	22 to37
Manganese Bronze Ingots	9 to11
Manganese Bronze Forgings	35 to43
Manganese Copper, 30%	23 to30
Monel Metal Shot	28
Monel Metal Blocks	28
Parsons Manganese Bronze Ingots	16 to18
Parsons Manganese Bronze Ingots	10 to12
Phosphor Copper, guaranteed 15%	14¾to16
Phosphor Copper, guaranteed 10%	14 to15½
Phosphor Tin, no guarantee	33 to40
Silicon Copper, 10%, according to quantity	25 to35

OLD METALS

Buying Prices		Selling Prices
7½to 8	Crucible Copper	8½to 9
7 to 7½	Heavy Copper and Wire	8 to 8½
6¼to 6¾	Light Copper	7¼to 7¾
4¼to 4½	Heavy Brass	5¼to 5½
3¾to 4	Light Brass	4¼to 5
6½to 6¾	No. 1 Composition	7½to 7¾
6 to 6¼	Composition Turnings	7 to 7¼
3¼to 3½	Heavy Lead	4¼to 4½
1½to 2	Old Zinc	2½to 3
2¼to 2½	New Zinc Clips	3¼to 3½
11½to12½	Aluminum Clips (new)	13 to15
4½to 5	Scrap Aluminum, cast, mixed	6½to 8½
7½to 8¼	Scrap Sheet Aluminum (old)	9 to11¼
15 to16	No. 1 Pewter	18 to20
20½to22½	Nickel Anodes	22½to24½
23 to25	Nickel scrap (new)	25 to29

Wrought Metals and Alloys

COPPER SHEET

Mill shipment (hot rolled) .....19½c. to 20½c. net base
Front Stock .....20½c. to 21½c. net base

BARE COPPER WIRE

11¼c. to 11½c. net base, in carload lots.

COPPER SEAMLESS TUBING

21⅞c. to 22⅞c. net base.

SOLDERING COPPERS

300 lbs. and over in one order.....18c. net base
100 lbs. to 300 lbs. in one order.....18½c. net base

ZINC SHEET

Duty on sheet, 2c. per lb.	Cents per lb.
Carload lots, standard sizes and gauges, at mill, less	Net Base
7 per cent discount	9.50
Casks, jobbers' price	9.75
Open casks, jobbers' price	10.50 to 10.75

ALUMINUM SHEET AND COIL

Aluminum sheet, 18 ga., base, ton lots, per lb..... 32.30
Aluminum coils, 24 ga., base price 30.00

ROLLED NICKEL SHEET AND ROD

Net Base Prices

Cold Drawn Rods.....	50c.	Cold Rolled Sheet.....	60c.
Hot Rolled Rods.....	45c.	Full Finished Sheet.....	52c.

BLOCK TIN SHEET

Block Tin Sheet—18" wide or less. No. 26 B. & S. Gauge or thicker, 100 lbs. or more, 12c. over N. Y. Pig Tin; 50 to 100 lbs., 18c. over; 25 to 50 lbs., 20c. over; less than 25 lbs., 25c. over.

SILVER SHEET

Rolled sterling silver (February 6) 29.75c. Troy oz. upward, according to quantity.

BRASS MATERIAL—MILL SHIPMENTS

In effect February 3, 1931
To customers who buy 5,000 lbs. or more in one order

	Net base per lb. High Brass	Low Brass	Bronze
Sheet	$0.16⅞	$0.18¼	$0.18⅞
Wire	.17⅜	.18¾	.19⅜
Rod	.15⅛	.18¼	.19⅜
Brazed tubing	.24⅜	....	.28⅜
Open seam tubing	.24⅞	....	.26⅞
Angles and channels	.24⅞	....	.26⅞

BRASS SEAMLESS TUBING

21¾c. to 22¾c. net base.

TOBIN BRONZE AND MUNTZ METAL

Tobin Bronze Rod	18½c. net base
Muntz or Yellow Metal Sheathing (14"x48")	18⅞c. net base
Muntz or Yellow Rectangular sheet other sheathing	18⅞c. net base
Muntz or Yellow Metal Rod	16⅛c. net base

Above are for 100 lbs. or more in one order

NICKEL SILVER (NICKELENE)

Net Base Prices

Grade "A" Sheet Metal		Wire and Rod	
10% Quality	24¾c.	10% Quality	27¾c.
15% Quality	26½c.	15% Quality	31½c.
18% Quality	28c.	18% Quality	35c.

MONEL METAL, SHEET AND ROD

Hot Rolled Rods (base)	35	Full Finished Sheets (base)	42
Cold Drawn Rods (base)	40	Cold Rolled Sheets (base)	50

BRITANNIA METAL SHEET

No. 1 Britannia—18" wide or less, No. 26 B. & S. Gauge or thicker, 500 lbs. or over, 10c. over N. Y. tin price; 100 lbs. to 500 lbs., 12c. over; 50 to 100 lbs., 18c. over; 25 to 50 lbs., 20c. over; less than 25 lbs., 25c. over. Prices F. O. B. mill.

Supply Prices, February 6, 1931

ANODES

Copper:	Cast	.21	c. per lb.
	Rolled, sheets, trimmed	18⅜	c. per lb.
	Rolled, oval	18⅜	c. per lb.
Brass:	Cast	.20	c. per lb.
Zinc:	Cast	11¼	c. per lb.

Nickel:	90-92%	45c. per lb.
	95-97%	47c. per lb.
	99%	49c. per lb.

Silver: Rolled silver anodes .999 fine were quoted Feb. 6 from 29.50c per Troy ounce upward, depending upon quantity.

FELT POLISHING WHEELS WHITE SPANISH

Diameter	Thickness	Under 100 lbs.	100 to 200 lbs.	Over 200 lbs.
10-12-14 & 16"	1" to 3½"	$3.00/lb.	$2.75/lb.	$2.65/lb.
6-8 & Over 16	1 to 3½	3.10	2.85	2.75
6 to 24	Under ½	4.25	4.00	3.90
6 to 24	½ to 1	4.00	3.75	3.65
6 to 24	Over 3	3.40	3.15	3.05
4 up to 6	¼ to 3	4.85	4.85	4.85
4 up to 6	Over 3	5.25	5.25	5.25
Under 4	¼ to 3	5.45	5.45	5.45
Under 4	Over 3	5.85	5.85	5.85

Grey Mexican Wheel deduct 10c. per lb. from White Spanish prices.

COTTON BUFFS

Full Disc Open buffs, per 100 sections.

11" 20 ply 64/67 Unbleached	$17.34 to 21.48
14" 20 ply 64/68 Unbleached	25.75 to 31.89
11" 20 ply 80/92 Unbleached	21.60 to 26.75
14" 20 ply 80/92 Unbleached	31.83 to 39.42
11" 20 ply 84/92 Unbleached	25.94 to 36.59
14" 20 ply 84/92 Unbleached	38.53 to 54.29
11" 20 ply 80/84 Unbleached	26.35 to 32.63
14" 20 ply 80/84 Unbleached	39.06 to 48.38

Sewed Pieced Buffs, per lb., bleached ..... 30c. to 79c.

CHEMICALS

These are manufacturers' quantity prices and based on delivery from New York City.

Acetone	lb.	.11-.15
Acid—Boric (Boracic) Crystals	lb.	.07¾
Chromic, 75 to 400 lb. drums	lb.	.16½-.20
Hydrochloric (Muriatic) Tech., 20 deg., carboys	lb.	.02
Hydrochloric, C. P., 20 deg., carboys	lb.	.06
Hydrofluoric, 30%, bbls.	lb.	.08
Nitric, 36 deg., carboys	lb.	.06
Nitric, 42 deg., carboys	lb.	.07
Sulphuric, 66 deg., carboys	lb.	.02
Alcohol—Butyl	lb.	.15¾-.21¼
Denatured, drums	gal.	.42-.50
Alum—Lump, barrels	lb.	.03¼-.04
Powdered, barrels	lb.	.04
Ammonium chloride, solution in carboys	lb.	.06½
Ammonium—sulphate, tech., bbls.	lb.	3.3
Sulphocyanide	lb.	.65
Arsenic, white, kegs	lb.	.05
Asphaltum	lb.	.35
Benzol, pure	gal.	.58
Borax Crystals (Sodium Biborate), bbls.	lb.	.04½
Calcium Carbonate (Precipitated Chalk)	lb.	.04
Carbon Bisulphide, Drums	lb.	.06
Chrome Green, bbls.	lb.	.24
Chromic Sulphate	lb.	.30-.40
Copper—Acetate (Verdigris)	lb.	.23
Carbonate, bbls.	lb.	.16½
Cyanide (100 lb. kgs.)	lb.	.41
Sulphate, bbls.	lb.	4.65
Cream of Tartar Crystals (Potassium Bitartrate)	lb.	.27
Crocus	lb.	.15
Dextrin	lb.	.05-.08
Emery Flour	lb.	.06
Flint, powdered	ton	$30.00
Fluor-spar (Calcic fluoride)	ton	$70.00
Fusel Oil	gal.	$4.45
Gold Chloride	oz.	$12.00
Gum—Sandarac	lb.	.26
Shellac	lb.	.59-.61
Iron Sulphate (Copperas), bbl.	lb.	.01½
Lacquer Solvents	gal.	.85
Lead Acetate (Sugar of Lead)	lb.	.13¼
Yellow Oxide (Litharge)	lb.	.12½
Mercury Bichloride (Corrosive Sublimate)	lb.	$1.58
Nickel—Carbonate, dry bbls.	lb.	.32
Chloride, bbls.	lb.	.18
Salts, single, 300 lb. bbls.	lb.	.10½-.13
Salts, double, 425 lb. bbls.	lb.	.10½-.13
Paraffin	lb.	.05-.06
Phosphorus—Duty free, according to quantity	lb.	.35-.40
Potash Caustic Electrolytic 88-92% broken, drums	lb.	.083
Potassium Bichromate, casks (crystals)	lb.	.09¼
Carbonate, 96-98%	lb.	.06¼-.07
Cyanide, 165 lbs. cases, 94-96%	lb.	.57½-.60
Pumice, ground, bbls.	lb.	.02½
Quartz, powdered	ton	$30.00
Rosin, bbls.	lb.	.04½
Rouge, nickel, 100 lb. lots	lb.	.25
Silver and Gold	lb.	.65
Sal Ammoniac (Ammonium Chloride) in bbls.	lb.	.05¼
Silver Chloride, dry, 100 oz. lots	oz.	.25¾
Cyanide (fluctuating)	oz.	.33
Nitrate, 100 ounce lots	oz.	.22½
Soda Ash, 58%, bbls.	lb.	.02½
Sodium—Cyanide, 96 to 98%, 100 lbs.	lb.	.17
Hyposulphite, kegs	lb.	.03½-.04
Nitrate, tech., bbls.	lb.	.04-.04¾
Phosphate, tech., bbls.	lb.	.03¾
Silicate (Water Glass), bbls.	lb.	.02
Sulpho Cyanide	lb.	.32½-.42½
Sulphur (Brimstone), bbls.	lb.	.02
Tin Chloride, 100 lb. kegs	lb.	.28
Tripoli, Powdered	lb.	.03
Wax—Bees, white, ref. bleached	lb.	.60
Yellow, No. 1	lb.	.45
Whiting, Bolted	lb.	.02½-.06
Zinc, Carbonate, bbls.	lb.	.11
Chloride, casks	lb.	.06¾
Cyanide (100 lb. kegs)	lb.	.38
Sulphate, bbls.	lb.	.03¼